



universität
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MASTERARBEIT

Titel der Masterarbeit

„In The Crowd We Trust -
Role and Challenges of Crowdsourcing and Citizen
Science in the Context of the Data Revolution:
An Interdisciplinary Approach“

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angestrebter akademischer Grad

Master (MA)

Wien, 2015

Studienkennzahl lt. Studienblatt:

A 067 805

Studienrichtung lt. Studienblatt:

Individuelles Masterstudium:
Global Studies – a European Perspective

Betreuerin / Betreuer:

Univ. Doz. Dr. Michael Nentwich

MASTERARBEIT / MASTER THESIS

Titel der Masterarbeit /Title of the master thesis

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Abstract

The Main Argument

Despite of persistent efforts from the part of organizations aiming to solve or to alleviate the world's most challenging issues, there are limitations of the current problem-solving system based on hierarchical bureaucratic models. These are mainly related to the powerlessness of the professional sector when, alone, facing global issues of ever increasing complexity and uncertainty. The current context often called "the network age" has in turn, supported and enhanced systems which serve as means for coping with these complex and uncertain scenarios, such as the concept of distributed cognition that leads (in its positive aspects) to collaborative, participatory and peer-to-peer common oriented processes, including the emergence of decentralized systems as well as the gradual empowerment of the civil society (overlapping with the latter); forming altogether, the background of latent paradigm shifts.

Concurrently there is the political discourse (driven by the UN) on Sustainable Development Goals (SDGs) and of a Data Revolution, where the claim is that the latter is indispensable for achieving the former. The Data Revolution's main purpose is to fill data gaps in order to leave no one behind and its realization is also crucial for unlocking other latent paradigm shifts. This thesis introduces the core concepts of such a paradigm shifts whilst focusing on two collaborative approaches for data collection and analysis: crowdsourcing and citizen science; most specifically on their role and challenges in the context of the current data revolution. Crowdsourcing and citizen science (also citizen journalism and other participatory monitoring activities) are not just part of the context of latent paradigm shifts, but do play a major role for the realization of a data revolution, once professionals and machines do not currently suffice to fill those data gaps. This hinders proper accounting, planning and distribution of resources and hence spoils efforts to tackle the critical issues involved in the SDGs.

Unfortunately there is wide reluctance from the part of the institutions (UN, INGOs and governments) in adopting these approaches as valid data/information sources. The main goal of this MA thesis is to identify the reason behind this reluctance, shedding light on deadlocks hampering the consolidation of a data revolution. In order to do so, the problematic was approached from multiple perspectives, characterizing a truly interdisciplinary inquiry, which, based on the approach of the "informed grounded theory", present the main challenges of crowdsourcing and citizen science in multiple levels and from multiple perspectives.

From a pragmatic perspective, issues related with data quality as well as the issue of little understanding have been the most cited. Withal the fact that both issues are not exclusive to crowdsourcing or citizen science has shown to be crucial for the present inquiry, although widely neglected in the literature. Thus for this and other important reasons to be further discussed throughout chapters 3 and 4, an alternative to the "quality-centred" approach towards crowdsourcing and citizen science is appropriate, nevertheless the quality issue should not be disregarded, as it is reasonable, but eventually addressed in a different manner as part of the problematic, but not as "the problematic" itself.

In addition, prejudice from the part of professionals has been cited by some expert interviewees as the "real" reason behind the reluctance vis-à-vis crowdsourcing and citizen science as valid data/information sources. Analysis has shown that prejudice is omnipresent with regards to

new technologies or any novel approach. For there is no time to wait for wider acceptance, given the urgency of matters, and as prejudice shows to result from ignorance linked to the clash of paradigms, this thesis also focuses on the question what lays behind prejudice. In order to answer this question, other crucial parts of the problematic encompassing constrained professional autonomy, risk and blame aversion are discussed throughout the thesis, forming altogether a hypothesis advocating that the resistance from the part of institutions towards crowdsourcing and citizen science is not just rooted on prejudice, but also on lack of trust in society; being both resultants of excess of accountability which has been ultimately delineated by public discourse. After a rough analysis, the latter has shown to be in unbalance, overemphasizing the need for accountability and consequently (based on the premise of a necessary balance between trust and control/accountability), inadvertently, undermining trust.

Paradoxically the overdose of accountability in public discourse reflects an attempt to restore trust in society. This paradox can be found also within the discourse on the data revolution, hindering this and other latent paradigm shifts of thriving, as for them all mutual trust is a requisite. If there is no trust from the part of organizations towards the public, there will be no room (acceptance) for approaches relying on citizen-generated data, leaving data gaps and many people and countries behind. The outcomes of this analysis is useful for those stakeholders contributing to the discourses on the fundamental role of a data revolution, as they should reframe the latter giving more weight to “top-down” trust, if we are to see the realization of such a shift.

Outline of The Thesis

The thesis starts with a brief contextualization of the technological and socio-political context followed by putting the main research question: “What lays behind the phenomenon of the reluctance of organizations to embrace crowdsourcing and citizen science approaches for data collection and analysis?” Following from this, the following sub-questions are elaborated: (1) “Which of the three actor groups of concern in this study (NGOs, UN and governments) is more likely to act positively toward crowdsourcing and citizen science approaches and why?” (2) “Which are the most frequently named issues of these approaches that may be hampering wider acceptance and adoption, and what are the proposed respective potential solutions?”

Chapter 2 presents the applied methodology, where an explanation of the method of analysis “[partial] informed grounded theory” is provided along with a rationalization of the choice. Then the researcher’s position is discussed, bringing up some personal motivations and experiences which may have played a role in shaping the present work. Subsequently one finds a literature review and methodological approaches, including a detailed description of the interviewing process and the analytical strategy.

The theoretical framework is presented in chapter 3, drawing on theories and theoretical frameworks such as: the philosophy of language, semiotics and Searle’s social ontology; organizational theories, including Weber’s theory of bureaucracy, incentive theories, risk avoidance and transfer, as well as a more detailed approach concerning the roles of IOs, INGOs and NGOs in the global arena, as well as power relations appertain to these organizations; philosophy on accountability, trust and control; Foucault’s stand on power and knowledge as well as his conception of genealogies and subjugated knowledge; data quality in uncertain scenarios; and Hutchin’s theory of distributed cognition; will show to be fundamental to the full understanding of the rationale of this this thesis as well as for supporting argumentation throughout the work.

The core concepts of the thesis “crowdsourcing and citizen science” (also citizen journalism and other participatory activities for data collection and analysis), as well as a conceptual framework, presented as an overview of the multi-modal scenario regarding latent paradigm shifts based on mutual trust is discussed in chapter 4, followed in chapter 5, by the analysis of the data/information gathered through interviews and its relation to other sources, and of suggestions for overcoming the mentioned challenges.

Chapter 6 summarises the final hypothesis and considers how to resolve the deadlock provoking the phenomenon in question.

Kurzfassung

Das Hauptargument

Trotz anhaltender Bemühungen von Organisationen die Herausforderungen der Welt zu lösen oder zu lindern, stoßen die aktuellen Lösungsansätze, welche auf hierarchisch-bürokratischen Modellen beruhen, an ihre Grenzen. Dies ist hauptsächlich der Machtlosigkeit der Experten geschuldet, wenn diese allein der steigenden Komplexität und Unsicherheit globaler Probleme gegenüberstehen. Die aktuellen Verhältnisse, oft „Zeitalter digitaler Netzwerke“ genannt, haben auf der anderen Seite Instrumente hervorgebracht, um mit diesen komplexen und unsicheren Szenarien umzugehen. Ein Beispiel ist der Ansatz der Distributed Cognition, der (im optimalen Fall) kollaborative, partizipative und gemeinschaftlich orientierte (peer-to-peer) Prozesse hervorbringt und so zur Entstehung dezentraler Systeme und der allmählichen Stärkung der Zivilgesellschaft führt. Zusammengefasst begründen diese den Hintergrund für latente Paradigmenwechsel.

Im aktuellen politischen Diskurs, vorangetrieben durch die UN, über die Ziele Nachhaltiger Entwicklung (Sustainable Development Goals, SDGs) und die Datenrevolution wird behauptet, dass letztere unabdingbar für das Erreichen der ersteren ist. Das Hauptanliegen der Datenrevolution ist es, Lücken in den Daten zu füllen, um alle einzubeziehen. Ihre Realisierung ist außerdem maßgeblich für das Auslösen weiterer Paradigmenwechsel. Diese Arbeit stellt die Kernkonzepte dieser Paradigmenwechsel vor, konzentriert sich auf zwei kollaborative Ansätze der Datensammlung und -analyse und betrachtet deren Rollen und Herausforderungen im Kontext der aktuellen Datenrevolution: Crowdsourcing und Citizen Science (außerdem Citizen Journalism und andere partizipative Beobachtungsaktivitäten). Beide Ansätze sind nicht nur Teil dieses latenten Paradigmenwechsel, sondern spielen auch eine enorme Rolle für dessen Realisierung – spätestens dann, wenn Fachkräfte und Maschinen nicht mehr ausreichend in der Lage sind, die Datenlücken zu füllen, was eine angemessene Berechnung, Planung und Verteilung von Ressourcen verhindert und damit die Erfüllung der SDGs in Frage stellt.

Leider herrscht in den Institutionen (UN, internationale NROs und Regierungen) weitgehend Widerstand, diese Ansätze als valide Daten- und Informationsquellen anzuerkennen. Das Hauptanliegen dieser Masterarbeit besteht darin, den Grund für diese Widerstände zu identifizieren und die Blockaden zu beleuchten, welche die Konsolidierung der Datenrevolution verhindern. Zu diesem Zweck wurde die Problematik aus verschiedenen Perspektiven betrachtet, um die Hauptprobleme von Crowdsourcing und Citizen Science angemessen darstellen zu können, was in einem stark interdisziplinären Verfahren mündete, welches der Vorgangsweise der „informed grounded theory“ folgt.

An den Ansätzen Crowdsourcing und Citizen Science wurde von einem pragmatischen Standpunkt aus die Datenqualität sowie das mangelnde Verständnis hinter diesen am meisten kritisiert. Die Tatsache, dass beide Probleme nicht exklusiv für Crowdsourcing oder Citizen Science gelten, stellte sich als äußerst nützlich für die vorliegende Untersuchung heraus, obwohl sie in der Literatur weitgehend ignoriert wird. Aus diesem und weiteren Gründen, die in den Kapiteln 3 und 4 diskutiert werden, ist eine Alternative zu den „qualitätszentrierten“ Ansätzen angebracht. Die Frage der Qualität sollte jedoch nicht übergangen werden, da sie bedenkenswert

ist; in dieser Arbeit wird sie letztlich als Teil der Problematik behandelt, nicht jedoch als „die Problematik“ an sich.

Des Weiteren wurden von Seiten der interviewten Experten Vorurteile als der „wahre“ Grund hinter dem Widerstand gegen Crowdsourcing und Citizen Science genannt. Analysen haben gezeigt, dass Vorurteile gegenüber neuen Technologien und neuen Ansätzen weit verbreitet sind. Weil es jedoch aufgrund der Dringlichkeit der Umstände keine Zeit zu verschwenden gilt und weil sich im Fall von latenten Paradigmenwechseln Vorurteile als Resultat von Nichtwissen herausgestellt haben, konzentriert sich diese Arbeit auch auf die Frage, was hinter diesen Vorurteilen steckt. Um sie zu beantworten, beschäftigt sie sich mit der eingeschränkten professionellen Autonomie sowie dem Widerwillen der Institutionen, Risiken und Vorwürfe in Kauf zu nehmen. Es wurde die Hypothese entwickelt, dass der Widerstand gegenüber Crowdsourcing und Citizen Science nicht nur in Vorurteilen begründet ist, sondern auch in einem Mangel an Vertrauen in die Gesellschaft. Beides geht auf das Übermaß an Rechenschaftspflichten zurück, welches im öffentlichen Diskurs eingeschrieben ist. Eine grobe Analyse zeigt ein Ungleichgewicht dieses Diskurses, welcher die Rechenschaftspflicht überbetont und dementsprechend Vertrauen erschwert (basierend auf dem notwendigen Gleichgewicht zwischen Vertrauen und Kontrolle/ Rechenschaft).

Paradoxerweise spiegelt die Überbewertung der Rechenschaftspflicht im öffentlichen Diskurs den Versuch wider, das Vertrauen in der Gesellschaft wiederherzustellen. Dieses Paradox kann auch im Diskurs über die Datenrevolution gefunden werden, wo es diese und andere latente Paradigmenwechsel behindert, für die gegenseitiges Vertrauen notwendig ist. Sollte es kein Vertrauen von Seiten der Organisationen gegenüber der Öffentlichkeit geben, können auch Ansätze nicht akzeptiert werden, die auf bürgergenerierten Daten beruhen, was dazu führt, dass Lücken in den Daten bestehen bleiben, wodurch viele Menschen und Länder nicht einbezogen werden. Die Ergebnisse dieser Arbeit sind nützlich für jene Stakeholder, die Beiträge zur fundamentalen Rolle der Datenrevolution leisten, da sie diese so formulieren müssen, dass „top-down“ Vertrauen mehr Gewicht beigemessen wird, wenn ein Wandel realisiert werden soll.

Aufbau der Arbeit

Die Arbeit beginnt mit einer kurzen Kontextualisierung des technologischen und gesellschafts-politischen Rahmens, gefolgt von der grundsätzlichen Forschungsfrage: „Was steckt hinter dem Phänomen des Widerstandes der Organisationen gegenüber Crowdsourcing und Citizen Science zur Datensammlung und -analyse?“ Anschließend werden folgende Subfragen ausgearbeitet: [1] „Welche der drei für diese Arbeit relevanten Gruppen von Akteuren (NROs, UN, Regierungen) wird sich diesen Ansätzen eher öffnen und warum?“ [2] „Welche sind die meistgenannten Probleme dieser Ansätze, die am ehesten Akzeptanz und Anwendung verhindern, und was sind die jeweils vorgeschlagenen Lösungen?“

Kapitel 2 beschreibt die angewandten Methoden. Die Wahl der „[partial] informed grounded theory“ wird vorgestellt und begründet. Anschließend werden die Position der Autorin und einige persönliche Motivationen und Erfahrungen dargestellt, die zur vorliegenden Arbeit beigetragen haben. Es folgt eine Literaturanalyse und eine Beschreibung des methodischen Vorgehens, inklusive einer detaillierten Beschreibung des Interviewprozesses und der Analysemethode.

Der theoretische Rahmen wird in Kapitel 3 präsentiert, wobei auf folgende Theorien und Ansätze Bezug genommen wird: Sprachphilosophie, Semiotik und Searles Sozialontologie;

Organisationstheorie, inklusive Webers Theorie der Bürokratie, Theorien zu Anreiz, Risikoumgehung und -transfer, sowie detailliertere Ansätze zu den Rollen internationaler Organisationen, nationalen und internationalen NROs in der globalen Arena und deren Machtbeziehungen; Philosophie der Rechenschaftspflicht, Vertrauen und Kontrolle; Foucaults Position zu Macht und Wissen, seine Auffassungen zu Genealogie und subjugiertem Wissen; Datenqualität in ungewissen Szenarien; sowie Hutchins Ansatz der Distributed Cognition. Diese theoretischen Konzepte erweisen sich als fundamental für das Gesamtverständnis der Aussage dieser Arbeit, rahmen aber auch die unterstützenden Argumentationen der Arbeit.

Die Kernkonzepte Crowdsourcing und Citizen Science, sowie ein konzeptioneller Überblick des multi-modalen Szenarios bezüglich latenter Paradigmenwechsel basierend auf gegenseitigem Vertrauen wird in Kapitel 4 präsentiert. In Kapitel 5 werden die in den Interviews gesammelten Daten analysiert und zu anderen Quellen in Bezug gesetzt. Hier findet sich auch eine Sammlung von Anregungen, wie die vorher identifizierten Probleme überwunden werden können.

Kapitel 6 fasst das Hauptargument der Arbeit zusammen und schließt mit Überlegungen zu Lösungsansätzen, wie die Blockade aufgelöst werden könnte.

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“Never again should it be possible to say ‘we didn’t know’. No one should be invisible. This is the world we want – a world that counts.” - IEAG’s Report¹

“We are on the threshold of the most important year of development since the founding of the United Nations itself. We must give meaning to this Organization’s promise ‘to reaffirm faith in the dignity and worth of the human person’ and to take the world forward to a sustainable future.” - Ban Ki Moon²

“Like a good Kantian, she³ thinks it is our duty to be trustworthy, not our right to be able to trust safely.” - Annette Baier⁴

“And yet in our world everybody thinks of changing humanity, and nobody thinks of changing himself.” - Tolstoy⁵

1 IEAG (2014:3).

2 Ki-Moon (2014).

3 Reference to philosopher Onora O’Neill.

4 Baier (2013:184).

5 Tolstoy (1900:29).

1 Introduction

1.1 Context: latent paradigm shifts

The present work has been developed in the context of interrelated latent paradigm shifts such as the notions of post-normal science⁶; of access and availability over ownership^{7,8} of collaborative, participatory and peer-to-peer processes (e.g. modes of production and problem solving)^{9,10,11} fostering decentralization, and of the institutional format named ‘the commons’¹² or “common goods”.

All the former are as several other conceptions including those central to this thesis (crowdsourcing and citizen science) not new, yet they have gained strength and visibility thanks to the advent of the Internet and cyberspace¹³ and its respective consolidation. The latter has shown to be the most valuable channel for collaborative, participatory and sharing practices, fundamental to the fulfilment of the notions above, which characterize latent paradigm shifts as they challenge many of the current assumptions generally perceived as “givens” such as centralized production and ownership, and hierarchical accountability systems, while re-assigning value to *trust*. The ongoing discourse on a momentous data revolution, which by [implicitly]¹⁴ urging public participation and more transparency¹⁵, would support these emerging paradigms if there were not such an excess of focus on accountability (transparency) at the expense of trust.

“New technologies are leading to an exponential increase in the volume and types of data available, creating unprecedented possibilities for informing and transforming society and protecting the environment. Governments, compa-

6 Funtowicz & Ravetz (1990, 1992, 1993).

7 With due consideration to the right to individual privacy.

8 Most known through the terms “open data”, “open access”, “free software”, “open knowledge”.

9 Mostly opposing to centralized, bureaucratic systems and favouring trust relationships.

10 Mainly advocated by those referring to a “collaborative economy” and broadly intersecting with the former notion, it encompasses among others, crowdsourcing (e.g. Wikipedia) and citizen science practices, open source softwares (e.g. Linux) and the “makers movement” frequently represented by FabLabs. See: [fabfoundation.org/fab-labs/fab-lab-criteria]; Accessed on the 23th of March 2015 (as all the following websites cited in this work). The theoretical background of such practices is drawn by conceptions such as collective intelligence, wisdom of crowds and distributed cognition.

11 Also the so called “sharing economy” potentially falls under the peer-to-peer umbrella. Examples of the latter are car-, tools-, skills-, accommodation sharing platforms such as Airbnb (a monetized example) and Couchsurfing. See respectively: [http://www.airbnb.com]; [http://www.couchsurfing.com].

12 Examples of commons are the cyberspace, nature, other common goods and ideally knowledge. The first example recalls a main stream debate which has been whipped up when Edward Snowden has disclosed confidential information from the NSA (United States National Security Agency) concerning espionage: privacy and cyberspace neutrality as regarded “a common good” of humanity. For the latest news on the topic see: [http://www.theguardian.com/us-news/edward-snowden].

13 Itself a “common”.

14 Excepting the IEAG report.

15 Aiming more accountability from the part of decision makers for achieving the Sustainable Development Goals (SDG) and for restoring public trust in institutions and organizations, which has been the lowest since it has started to be measured.

nies, researchers and citizen groups are in a ferment of experimentation, innovation and adaptation to the new world of data, a world in which data are bigger, faster and more detailed than ever before. This is the data revolution.”¹⁶

In the year of 2014 an independent expert advisory group (IEAG) was convened by UN (United Nations) Secretary-General Ban Ki Moon to propose ways to improve data for achieving and monitoring sustainable development.¹⁷ The final report prepared by the IEAG, released in November 2014¹⁸ brings key recommendations for the Secretary-General and member national states to consider for the post-2015 agenda in order to tackle, according to the IEAG, the two biggest global challenges regarding data today: (1) the challenge of invisibility (gaps in what we know from data, and when we find out); (2) the challenge of inequality (gaps between those with and without information, and what they need to know to make their own decisions).¹⁹

The IEAG report addresses the need for more data (indeed, but with focus on essential data and complete data), better data (data quality, including timelines) and open data (accessibility, transparency), that is, all relevant facets of comprehensible data²⁰ (sometimes named “usable data”). Crowdsourcing (non-profit) and citizen science (as well as citizen journalism) approaches do not just have the potential to address this need, but are crucial for the realization of a data revolution. In the case of crowdsourcing, it is indeed essential at least as a bridging solution until technology for data analysis and environmental sensing gets so far, as it will be discussed in chapter four as the concept of “big data” is elucidated. Since we do not know when this will happen, it is reasonable to look at the solution we now have, based on distributed cognition between humans and machines, and learn about its challenges, so then a data revolution, hence global sustainable development, does not need to wait indefinitely for the rise of appropriate technologies. This work explains how crowdsourcing and citizen science approaches are particularly suitable for providing “more essential data” and “timely data”, withal “quality data” should also encompass the two approaches as it will be discussed in chapters five and six; and approaches the various challenges hampering their adoption.

Finally if we are to witness serious commitment from the part of UN member-states with at least some of the recommendations proposed through the IEAG report, it can be considered a cardinal step towards the formalization of a major shift concerning data, accountability, trust and problem solving as key features of the notions brought to attention on the top of this section, including crowdsourcing and citizen science. Withal I argue in this thesis that for the consolidation of such a major shift, not just the main perceived challenges (based on pragmatic assumptions) and best practices of the approaches in question must be placed in the centre of the discourse, as briefly explained in the last paragraph, but these challenges must be confronted with the underlying conceptions of a data revolution such as regulatory systems and accountability mechanisms and mutual trust, as a deep-rooted contradiction emerges throughout the data analysis.

¹⁶ IEAG (2014:2).

¹⁷ [<http://www.undatarevolution.org>].

¹⁸ IEAG (2014).

¹⁹ [<http://www.undatarevolution.org/report>].

²⁰ Open Knowledge as defined by the Open Knowledge Foundation: Open data are the building blocks of open knowledge. Open knowledge is what open data becomes when it's useful, usable and used [<https://okfn.org/opendata>].

1.1.1 Challenges of Crowdsourcing and Citizen Science

The main research question driving this study is: **what is the reason behind a phenomenon where most organizations²¹ and institutions²² have been reluctant in adopting (non-profit) crowdsourcing and citizen science as data/information sources?** Aiming to determine the reason behind it, this thesis will identify and analyse the main challenges of implementation of these approaches in the contexts of the Sustainable Development Goals (SDGs)²³ and of a data revolution.

It is important to clarify that in this thesis, for the sake of the text flow I will mostly refer solely to “organizations” also when “institutions” (particularly governments as whole) are implied in the context; as for instance, when the reluctance vis-à-vis crowdsourcing and citizen science is addressed.

I emphasize the reluctance to accept such approaches as “data/information sources”, once the term “crowdsourcing”, as it will be explained in chapter four, does also apply to the crowdsourcing of ideas, for tackling real problems for instance, or of opinions such as in a poll, and the latter is not primary relevant for this inquiry as contrary to crowdsourcing and citizen science as data/information sources it enjoys wide acceptance. An evidence of such acceptance concerning this type of crowdsourcing that deals with creativity or approval/disapproval is the fact that it has been increasingly adopted by many organizations.²⁴

That being said, let us go back to the approaches in question. The two distinctive, but inter-related fields of crowdsourcing and citizen science belong to the realm of citizen-generated-data/information²⁵ which also encompasses collaborative research, also called collaborative thinking and collaborative computing.²⁶

Each of the terms “crowdsourcing” and “citizen science” correspond to different sets of practice, both fairly old as conceptions. Conceptions which have three intersections, which will turn out to be the focus of this work: (1) the involvement of amateurs and/or hobbyists, being an underlying feature of citizen science, in opposition to professional scientists, but not a compulsory element of crowdsourcing, although very frequent; (2) the engagement of anonymous contributors, characteristic which is not imperative to any of the fields but which is currently fairly common in both of them²⁷; (3) the considerably high numbers of contributors engaged, which is an inherent characteristic of crowdsourcing and nowadays also widely present in citizen science as it will be explained in the next paragraph.

It is noteworthy that both the anonymous character of the participants and the very high number of contributions were aggregated to the citizen science practice precisely when the latter has

21 When using the term “organization” I refer to NGOs, INGOs, UN agencies and also government departments.

22 Here the main example are governments as whole, such as national or local governments.

23 [<https://sustainabledevelopment.un.org/topics/sustainabledevelopmentgoals>].

24 See: “5 crowdsourcing examples on how the United Nations open up”: [<http://www.criss-crossed.net/2014/06/02/crowdsourcing-examples-united-nations>].

25 Or “public-generated-data/information”.

26 [<http://conference.unitar.org/unosat-applies-collaborative-computing-geographic-information>].

27 In as much as in a context of very high number of contributions (characteristic to crowdsourcing) citizens’ profiles become irrelevant since quality control will not be carried out individually anyway.

joined forces with crowdsourcing. When this happened scientific research could also benefit from technological advancements which have been enabling (at first in the business field) the reach of a much greater and diverse number of contributors all over the globe, gathering a never imagined amount of data and information, as well as supporting machines in processing big data. This overlap has opened space for a middle field between the two conceptions as Wiggins (2012) mentions:

“Citizen Science projects that are entirely mediated by information and communication technologies (ICTs) are often considered a form of crowdsourcing applied to science.”²⁸

This convergence has been named “crowd science” (Franzoni and Sauermann, 2013)²⁹ or, most commonly, it has been considered as being implicit, along with other “types”, to the recycled meaning of the original term “citizen science” as it will be discussed in chapter three where a more detailed inquiry concerning terminology will be carried out.

Furthermore, it is important to highlight that other two variations from the same approach: citizen journalism and participatory monitoring (e.g. community-based forest monitoring), which may not be concerned with scientific outputs (therefore not characterizing citizen science), by being based on the same principle of involving the or resorting to the crowd or the people in/for data/information collection and analysis, are affected by most (if not all) of the challenges identified throughout this thesis, as they too share the same three characteristics pinpointed above.³⁰ Nevertheless, for the sake of a reading flow, this thesis will refer solely to “crowdsourcing and citizen science”.

Also in chapter four, different types, architectures and purposes of crowdsourcing will be presented and discussed, while rationalizing the focus of this thesis on non-profit contributions instead of contributions driven by monetary or material compensation. As I will explain, these both veins of crowdsourcing are usually not clearly differentiated within the general discourse in spite of being an influential factor in what concerns the quality control of crowdsourced data/information, widely regarded to be the main challenge of the approaches in question. For they have an impact on the kind of relationship between contributors and project owners (e.g. level of accountability and trust), which will in turn, not just concern individual motivational triggers, but also on the final performance (ultimately data/information quality).

In the same chapter the role of crowdsourcing/citizen science frameworks within the contexts of a data revolution and of the SDGs will be presented. And thereby the fields of humanitarianism and environmentalism, generally driven by altruistic and cosmopolitan motivations³¹, will be highlighted due to their relevance for the latter.

Although technology has shown to be “ready for use” even if still not in the-state-of-the-art, the sceptism from the part of most organizations towards crowdsourcing and citizen science approaches as a valid and trustworthy data/information source remains, as already mentioned, a

²⁸ Wiggins & Crowston (2012:3426).

²⁹ Franzoni & Sauermann (2014).

³⁰ As (1); (2) and (3).

³¹ To be explained in the following paragraphs.

great issue to be solved. For tackling this phenomenon, it is fundamental to understand the processes underlying it.

In order to be able to answer the reasons behind this reluctance from the part of organizations, even in cases in which such data sets could represent life-saving assets, as in the context of humanitarian aid (e.g. disease outbreaks or armed conflict) and disaster response, I have interviewed a small pool of high profile professionals working inside the UN system and in INGOs (international nongovernmental organizations).

I would like to stress that this thesis has one main research question (relating to the reason behind the identified phenomenon, as described previously) and two other sub-research questions³², which refer to the two core questions posed to interviewees, being: (1) Which of the three actor groups of concern to this study (NGOs, UN and governments) is more likely to act positively toward crowdsourcing and citizen science approaches and why?³³; (2) Which are the most frequently named issues of these approaches³⁴ that may be hampering wider acceptance and adoption, and what are the proposed respective potential solutions?

Interviews' outcomes have pinpointed challenges of crowdsourcing. Two of them have shown to be common sense among professionals: data/information quality and lack of understanding (concerning the methods *per se*, their processes and applications). Some expert interviewees would refer to the identified phenomenon as being a product of prejudice deriving from this little understanding and characteristic from novel approaches in general, as they are all subjected to a technology adoption cycle³⁵.

After realizing that the raised challenges (also being the most discussed in the literature) are not an issue exclusive to crowdsourcing and/or citizen science, but rather to any novel approaches, and after confronting the these challenges with counter arguments or solution propositions³⁶, the lack of robust arguments supporting the non-acceptance of the approaches, was a strong indicator for the case of prejudice unveiled above, which would after a more discerning constant comparative analysis show to comprise the first and the second most named challenges into one complex problematic concerning regulatory mechanisms, particularly accountability, and trust, as a key notion brought about as an insight during the analysis of the first interview question. Hence I argue that the fact that the main perceived challenges (basic on pragmatic assumptions) are not particular to crowdsourcing or citizen science is crucial, and has been widely neglected, hampering in depth inquiries on the topic, characterizing the gap this thesis attempts to fill.

Thus at this point of the analysis there is a turn in the focus of the inquiry from “which are the perceived challenges” to “what lays behind the prejudice” (an auxiliary research question en-

32 As they were means to reach an ultimate answer for the main research question.

33 By formulating the core question I did not mention the “non-profit” aspect because all the interviewees were aware that I was making reference to this specific kind of crowdsourcing approach as most of them do work with the latter or within humanitarian or environmental fields.

34 Crowdsourcing and citizen science.

35 See: Gartner's “Technology Hype Cycle” for an example: [<http://www.gartner.com/technology/research/methodologies/hype-cycle.jsp>].

36 Based on or derived from interviewees' statements, consulted literature, documents, notes and observations.

suing from interviews' outcomes), aiming to identify the “real reason” for the reluctance in adopting crowdsourcing and citizen science, hence the actual challenge for these approaches in the context of a data revolution and of the SDGs.

The final hypothesis will be developed throughout this work by combining interviews' outcomes with field notes and observations and with existing literature on an array of related fields and topics, which are in turn, important pieces of the puzzle as they constitute the techno-socio-political context in which this thesis was developed and which was concisely presented in the first part of the introduction.

2 Methodology

2.1 Informed [partial] Grounded Theory

“Anselm especially liked people taking his work and running with it in strange directions. He was always curious about what people had done with grounded theory, though not always particularly impressed. He knew from the inside out that when you put something like GT out into the world, the world will do it as it pleases, rather than necessarily please you.”³⁷

“In their original statement of the method, Glaser and Strauss (1967) invited their readers to use grounded theory strategies flexibly in their own way.”³⁸

The main methodology employed for pursuing the aim of this thesis of identifying the reason behind the already discussed phenomenon may be called **informed³⁹ [partial] grounded theory**, which is itself based on Charmaz’ constructivist approach⁴⁰.

Grounded theory method, originally formulated by Glaser and Strauss⁴¹, may be seen as the reverse of traditional positivist way of conducting research in the social sciences, being often called a “reverse engineered hypothesis”. Instead of starting with a hypothesis, a theory or a theoretical framework and focusing the research in testing the latter, grounded theory concerns the reverse path: the theory, hypothesis and/or theoretical framework emerge and are shaped during data analysis, being itself an outcome from the inquiry. Glaser has in 2005 referred to the method as “a theory of resolving a main concern”.⁴²

Glaser and Strauss have in the formulation of the method proposed that literature review should be delayed in order for the researcher not to be “contaminated” with existent ideas. This line of thought has received many criticisms regarding the unviability of such a premise. Agreeing with this criticism, I have chosen to apply Thornberg’s concept of an “informed grounded theory”⁴³, approaching existing literature as follows:

“If researchers reject a naïve empiricism as well as theoretical forcing, then they do not dismiss extant theoretical and research literature nor apply it mechanically to empirical cases. Instead these researchers use the literature as a possible source of inspiration, ideas, ‘aha!’ experiences, creative associations, critical reflections, and multiple lenses, very much in line with the logic of abduction.”⁴⁴

37 Adele E. Clarke on Anselm Strauss *in*: Charmaz (2014:12).

38 Charmaz (2014:16).

39 Thornberg (2012).

40 Charmaz (2014).

41 Glaser and Strauss (2012).

42 Glaser (2005) *in*: Charmaz (2014:322).

43 Thornberg (2012).

44 “Abduction or, as it is also often called, Inference to the Best Explanation is a type of inference that assigns special status to explanatory considerations. Most philosophers agree that this type of inference is frequently employed, in some form or other, both in everyday and in scientific reasoning.” *In*: Stanford Encyclopaedia of Philosophy: [http://plato.stanford.edu/entries/abduction].

Kelle (1995, 2005) recognizes that pre-existing theories and research findings can be used as heuristic tools, i.e. using extant concepts, theories and ideas as 'lenses' and tools that help the researcher to focus the attention on certain phenomena, aspects or nuances as well as imaginarily see beyond data."⁴⁵

Thornberg's informed grounded theory is in turn, based on Charmaz' stand, rooted in a constructivist approach based on reflexivity. Constructivist grounded theory, says Charmaz, highlights the flexibility of the method and resists mechanical applications of it.⁴⁶ She also outlines the main points of her stand:⁴⁷

- The grounded theory research process is fluid, interactive, and open-ended.
- A general research topic informs initial methodological choices for data collection.
- Researchers are part of what they study, not separated from it.
- Grounded theory analysis shapes the conceptual content and direction on the study.
- The emerging analysis may lead to adopting multiple methods of data collection and to pursuing inquiry in several sites.
- Successive levels of abstraction though comparative analysis constitute the core of grounded theory analysis.
- Analytic directions arise from how researchers interact with and interpret their comparisons and emerging analysis rather than from external prescriptions or from inherent meanings in data.

And names nine strategies that she considers as being characteristic of the grounded theory method:⁴⁸

1. Conduct data collection and analysis simultaneously in an iterative process;
2. Analyse action and processes rather than themes and structure;
3. Use comparative methods;
4. Draw on data (e.g. narratives and descriptions) in service of developing new conceptual categories;
5. Develop inductive abstract analytic categories through systematic data analysis;
6. Emphasize theory construction rather than description or application of current theories;
7. Engage in theoretical sampling;
8. Search for variation in the studied category or processes;
9. Pursue developing a category rather than covering a specific empirical topic.⁴⁹

Charmaz notes that most researchers who claim grounded theory apply actions 1-5, which she sees as being evidence of a grounded theory study.⁵⁰ According to Charmaz, Hood⁵¹ considered theoretical sampling⁵² a key element for characterizing a grounded theory study; Charmaz stresses in turn, that few researchers show evidence of conducting theoretical sampling and of constructing theory, despite of their claims of having done both. Nevertheless she acknowledges that the absence of such evidence is not enough to discredit a work as grounded theory, for that according

⁴⁵ Thornberg (2012:7).

⁴⁶ Charmaz (2014:13).

⁴⁷ Ibid. p.320.

⁴⁸ Ibid. p.15.

⁴⁹ Charmaz (2010:11).

⁵⁰ Ibid.

⁵¹ Hood (2007).

⁵² "Theoretical sampling is the process of data collection for generating theory whereby the analyst jointly collects codes and analyses data and decides what data to collect next and where to find them, in order to develop a theory as it emerges." - Glaser & Strauss (2012:45).

to Charmaz, theories often rest on explicated abstracted concepts and not solely on explicit theory construction.⁵³

Thus Charmaz interprets grounded theory as a flexible, open-ended method, where its own characterization may vary from case to case; that is, **partial applications of the method may also be considered grounded theory** as the latter may also serve as a complement to other qualitative approaches of data analyse.⁵⁴

The overall format of a “reversed engineered hypothesis” in addition to the engagement of numbers 1-5 plus number 7 (even if concerning partial evidence of its application) should suffice to qualify this work as a grounded theory study. Withal to label it as a “partial application of grounded theory” would be even more pertinent since some of the actions pointed out by Charmaz in the above list were not engaged during the research process, mainly due to the constraints (time and space) of a MA thesis.

For instance, not theory, but hypothesis development was emphasized, relying however, apart from the empirical data, on the combination and on the insights of current theories from other fields. Constant comparative method as well as coding were applied as data from the interviews were categorized and constantly compared between themselves and with literature of different disciplines and fields in a non-linear, back and forth process. Nonetheless, due to the constraints of a MA thesis, it was not possible to go back to the main data corpus (interviews) for new comparisons and eventual “re-coding” after the hypothesis has been formulated, what would have provided more consistence to the latter. And again it was out of the scope of this work to search for variations in the studied processes, to develop a category rather than covering a specific empirical topic or to conduct a complete evaluation of the formulated hypothesis/theory concerning its originality, resonance and usefulness, as just the latter has been addressed.

2.1.1 Systems’ Thinking

“Sustainability calls for the globe as a relevant unit of analysis, and systems thinking is an appropriate theoretical framework for this task.”⁵⁵

In alignment with the vision of this work, which aims to solve the issues hampering the realization of latent paradigm shifts⁵⁶ and achieving global sustainability⁵⁷, this entire work may be considered to be a result of systems’ thinking⁵⁸ as it relies on principles from different knowledge systems (e.g. language, organizational structure) and theories or knowledge systems (to be addressed in the theoretical framework), and the interrelations between them for explaining the phenomenon in question through a systemic and holistic point of view. Grounded theory methods (itself a

⁵³ Charmaz (2014:15).

⁵⁴ Ibid. p.16.

⁵⁵ Schuetz (2000: abstract).

⁵⁶ Post-normal science; access and availability over ownership; collaborative, participatory and peer-to-peer processes (e.g. modes of production and problem solving); and the institutional format named “the commons” or “common goods” – all related to a greater overall paradigm shift concerning trust.

⁵⁷ SDG.

⁵⁸ Meadows (2008).

system) do also align with the systemic approach as through the process of theoretical sampling, a variety of knowledge systems (theories) is constantly confronted (compared) to one another and with empirical data, aiming to tackle the phenomenon from an array of possible perspectives.

2.2 Field of Study/Researcher's Positionality

“If, instead, we start with the assumption that social reality is multiple, processual, and constructed, then we must take the researcher’s position, privileges, perspective, and interactions into account as an inherent part of the research reality. It, too, as a construction. Thus, relativism characterizes the research endeavour rather than objective, unproblematic prescriptions and procedures. Research acts are not given; they are constructed. Viewing the research as constructed rather than discovered fosters researchers’ reflexivity about their actions and decisions.”⁵⁹

I do recognize the influential role of the researcher’s subjectivity in the research processes and analysis. Therefore I dedicate this section to place myself in the context of this work.

A first point that I would like to highlight is the significance of my undergraduate background in my research. This was heavily influenced by linguistics, semiotics and the philosophy of language as part of my degree in Letters. Since then, as it will be noticeable particularly in chapter three (theoretical framework) and throughout this work, I tend to pay more attention to semantics, believing that the latter, when embedded in discourse plays an important role in shaping social/institutional reality, which according to Searle’s theory of social ontology⁶⁰ is grounded on shared perceptions of reality resulting from previous societal agreements, which continues to be renewed.

As for intentionality, my [conscious] intention during the research process was bringing up “the reason(s)” underlying the current phenomenon: many organizations, from government departments to INGOs, are reluctant in fully acknowledging crowdsourcing and citizen science as valid methods for data/information gathering and analysis.

Apropos the phenomenon as well as the idea of the quest for identifying the processes operating behind the phenomenon, as described in the above paragraph, were brought to my attention during my internship period in the United Nations Institute for Training and Research (UNITAR)⁶¹ by Francesco Pisano⁶² and Dr. Francois Grey⁶³ in the occasion when I have exposed my interest in the fields of crowdsourcing and citizen science as well as my wish to get involved with such fields through my Master thesis research.

⁵⁹ Charmaz (2014:13).

⁶⁰ Searle (1995).

⁶¹ May – November 2013.

⁶² Francesco Pisano is Director for Research, Technology Applications and Knowledge Systems at the United Nations Institute for Training and Research (UNITAR). Pisanos is one of the interviewees who have contributed to this work.

⁶³ Francois Grey is coordinator of the Citizen Cyberscience Centre, honorary professor in the University College London (UCL), adjunct professor in the New York University, co-director in the Centre for Nano and Micro Mechanics of Tsinghua University (China), invited professor in the University of Geneva.

My interest in these fields arose after reading the project proposal of the Citizen Cyberlab⁶⁴, which I was supposed to present in a very summarized, “easy to swallow” version, what I did in parallel with a research on “Collaborative Economy” and the “Open Movement” for Click4it (the internal wiki of UNITAR)⁶⁵. In this period I have also attended the Open Knowledge Conference⁶⁶ through my internship in UNITAR.

All that in context, has referred to specific elements regarding the theoretical framework which have fascinated me the most: the idea of a potential realization of the conceptions of distributed cognition⁶⁷ and of collective intelligence⁶⁸ in large scale through online platforms; and the engagement of such modes of intelligence and cognition in solving the greatest global challenges.

Despite of the fact that in that time I have chosen to work with a particular case study concerning crowdsourcing⁶⁹ as the core of my thesis, I have dropped the case study during the research process for the sake of this single answer, the reason behind the identified phenomenon, which has shown to be of more complexity than previously thought as well as fundamental for further research on the field including the assessment of the case study in question.

In addition, not just my undergraduate studies but also the scope of my Master degree has most probably an important role to play in my observations. The subject of the degree I am pursuing is “Global Studies”. It is as it sounds, as extensive, all inclusive and flexible as one may think of, interdisciplinary in its character.

Apart from the introduction to the academic discourse on globalization through various perspectives, mainly historical, political and sociological, I have, especially during my studies in the University of Vienna, dedicated my time and academic credits⁷⁰ to the study of social sciences and human geography, as well as to a subject called “global sociology” that brought to my attention the ongoing discussion on cosmopolitanism, which has too a considerable influence in my research and actual paradigms (as it is going to become clear in this thesis), especially when it regards “digital cosmopolitanism”, a concept I have become aware of through the book of Ethan Zuckerman⁷¹ named “Rewire: Digital Cosmopolitans in the Age of Connection”⁷².

The choice of conducting interviews came up after a conversation with Pisano who has stressed that it would be interesting to talk to different people within the UN system about their perception of crowdsourcing and citizen science. Pisano and Grey, along with other people related to the Citizen Cyberscience Centre⁷³ were very supportive during the research process, pointing me out relevant literature on the topic and introducing me to high profile professionals within the UN system, INGOs and NGOs for the arrangement of interviews.

64 To the Seventh Framework project (FP7) of the European Union.

65 [http://www.click4it.org/index.php/Main_Page].

66 September 2013.

67 To be further clarified in the theoretical framework (section 3.6).

68 For Tom Atlee, collective intelligence is “The INTELLIGENCE of a COLLECTIVE, which arises from one or more SOURCES.” For the complete formulation and many other definitions see: [<http://www.co-intelligence.org/CollectiveIntelligence2.html>].

69 Forest Watchers: [<http://forestwatchers.net>].

70 ECTS - European Credit Transfer and Accumulation System.

71 Director of the MIT Centre for Civic Media.

72 Zuckerman (2013).

73 Supported by the Google Hangout platform for group video calls: [<https://plus.google.com/hangouts?hl=pt-BR>].

During the beginning of the research process I have passively (mostly as a listener) participated in a couple of “Citizen Science Unhangouts” organized by Grey to discuss projects related to the Citizen Cyberscience Centre. This experience has provided me with a brief overview on the “behind the scenes” of the citizen science/crowdsourcing community, which has helped me to orientate in the very beginning of this journey when I was still getting acquainted with the topics, academically and practically (projects and active communities).

Another experience which has substantially contributed to my understanding of the fields of crowdsourcing and citizen science was the attendance of the Citizen Cyberscience Summit in February 2014, thanks to the support of my supervisor for this thesis, Dr. Michael Nentwich, which has resulted in a fifteen pages report of the summit plus fifteen pages analysis of the most raised topics.

To conclude I must acknowledge my inclination to systems thinking and phenomenological reflection, constantly looking for the essence, the absolute behind the shared perception of a given phenomenon and its relation to the whole, becoming evident as I chose grounded theory as methodology and develop the theoretical framework.

2.3 Literature Review

Accounting that the present work has a multifaceted aspect due to the complexity of the phenomenon in question, leading to the reliance on the expertise of multiple domains for the development of the final hypothesis, it would not be pertinent to the character of the thesis to make a full literature review from each of the approached fields. Nevertheless it is possible to pinpoint the main research questions as well as respective outcomes and supporting theories (to be explained in chapter three) linking them to main authors on each discipline.

It is important to highlight that by writing on emerging technologies, paradigms and processes, there will be limited and sometimes none direct literature on the topic and often, valuable information, discussions and point of views are to be found in the web (blogs, online founded newspapers, websites, forums) or through interviews and informal conversations with experts before academia gets engaged. Therefore when generally speaking, at least a tiny part of literature review concerns these kind of knowledge, called by Foucault⁷⁴ subjugated knowledges, which interestingly enough are also analogous to the kind of knowledge produced by the collection and analysis of data/information through crowdsourcing and citizen science, topic to be explained in the theoretical framework and contextualized in chapter three as the relevance of crowdsourcing and citizen science in the socio-techno-political context is discussed.

The focus of this thesis is to answer the question of what lays behind the phenomenon of reluctance to embrace crowdsourcing and citizen science approaches for data collection and analysis from the part of organizations and in a [non-profit] level.⁷⁵ In order to answer it, the questions

⁷⁴ Foucault (1980).

⁷⁵ Main research question; overall goal.

posed during the process of empirical data collection have approached the challenges of crowdsourcing and citizen science and the positioning of organizations vis-à-vis such approaches.⁷⁶

The report⁷⁷ on the mobilisation of a data revolution prepared upon request of the UN Secretary-General Ban Ki-moon by an independent group of experts has provided essential information on the preferable future of data/information for playing the crucial role of supporting policy and decision makers in the achievement of the SDG⁷⁸, hence serving as a more pragmatic contextualization for the present work, as based on studies on big data analysis and other theories and conceptions to be approached in the upcoming paragraphs, crowdsourcing and citizen science are keys for the realization of the data revolution outlined in the IEAG's report. The report will also be reanalysed after the formulation of the final hypothesis for the purpose of adding more consistence to the latter.

I have not come across any study addressing in depth the reason behind the phenomenon mentioned above as such, yet some studies have addressed challenges of the approaches of our interest. However challenges have been handled not just as manifest but also as ultimate truth, leaving little room for further inquiry on higher levels of abstraction.

The most self-evident challenge which also came up in the interviews' analysis is "data/information quality", topic on which a considerable literature⁷⁹ has been produced, particularly within the fields of citizen science (Delaney et al.⁸⁰: 2008; Crowston & Prestopnik: 2013; Alabri & Hunter: 2010; Galloway et al.⁸¹: 2006) and volunteered crowdsourcing of geographical information, also called VGI (Haklay et al.⁸²: 2010; Goodchild & Glennon: 2010; Flanagan & Metzger: 2008; Comber et al.⁸³ 2013).

The second challenge identified during this work through empirical data analysis and constant comparison, concerns "little understanding" and "prejudice" (bias). Notwithstanding little if none representative literature was found where these topics were directly addressed, instead, articles have been approaching more functional challenges, focusing on motivational issues⁸⁴ (also borrowing from literature addressing volunteer motivations in general⁸⁵) and/or on structural issues, including terminologies, definitions, typologies and models⁸⁶, also for solving quality issues.⁸⁷ Articles concerning descriptive case studies on the field, reporting success or failures are also very common and together, the intensive research on the former topic may be understood

76 Pragmatic research questions, supporting the latter.

77 IEAG (2014).

78 To be released.

79 See: Vempaty, Varshney & Varshney (2013); Naroditskiy, Jennings, Van Hentenryck & Cebrian (2013); Lease (2011); Hsueh, Melville & Sindhvani (2009).

80 Delaney, Sperling, Adams & Leung.

81 Galloway, Tudor & Haegen.

82 Haklay, Basiouka, Antoniou & Ather (2010).

83 See: Comber, Salk, Fritz, van der Velde, Perger & Obersteiner. (2013).

84 Raddick, Bracey, Gay, Lintott, Murray, Schawinski. & Vandenberg (2010); Iacovides, Jennett, Cornish-Trestrail. Cox, A. L. (2013); Reed, Raddick, Lardner, & Carney (2013); Nov (2007); Coleman, Georgiadou & Labonte. (2009); Borst (2010); Nov, Arazy & Anderson (2011).

85 Lawrence (2006).

86 Montabone (2012); Wiggins & Crowston (2012; 2010); Haklay (2013); Estellés-Arolas & González-Ladrón-de-Guevara (2012); Nov, Arazy, & Anderson (2010); Franzoni & Sauermann (2014); Shirk, Ballard, Wilderman, Phillips, Wiggins, Jordan & Bonney (2012).

87 Antelio, Esteves, Schneider, & de Souza (2012).

as a collective effort for achieving high efficiency by the time of implementation and management of crowdsourcing or citizen science based projects. One way of interpreting this scenario is to say that in the field of data collection and analysis, high efficiency refers back to data/information quality; thus the challenges pinpointed by the literature, other than data/information quality, can be considered fundamentally as parts of the latter.

Thus for this and other important reasons to be further discussed throughout the presentation of the theoretical framework (chapter three) and in chapter four, an alternative to the “quality-centred” approach towards crowdsourcing and citizen science is appropriate, nevertheless the quality issue should not be disregarded, as it is reasonable, but eventually addressed in a different manner as part of the problematic, but not as “the problematic” itself.

Interviewees have made a substantial contribution in pointing out the direction an inquiry regarding data/information quality in crowdsourcing should take, highly influencing the path of this work. *Meier* in particular, has not only stressed important key topics during the interview but keeps himself a blog⁸⁸ where he addresses topics related to crowdsourcing (and the employment of other technologies in the humanitarian field) and where very relevant remarks concerning data quality can be found, as for instance a comparison with “911 emergency calls”.⁸⁹

Terms such as triangulation and cross-referencing were present in the discourse of more than one interviewees (*Meier*, *Verity* and *Olafsson*) leading to the work of *Gerhard Backfried* and his team at Sails Lab⁹⁰ on cross-referencing media⁹¹. In a Skype conversation, *Backfried* was the first person to acknowledge the cardinal role of accountability, mentioning the potential relevance of the field of risk management for the purpose of this study.⁹² The insight concerning triangulation is closely related to the theory of distributed cognition, formulated by *Hutchins*⁹³, which will be discussed in the theoretical overview and which plays a major role in supporting the approaches of crowdsourcing and citizen science for data collection and analysis as it will be elucidate throughout this work.

Meier, *Verity* and *Olafsson* have during the interviews insisted to refer to crowdsourcing as an extra source for data/information, which would add a layer over existing ones, although as it will be discussed in chapter four, this “complemental” character is not the only facet of the discourse on crowdsourcing. *Levine*’s perception towards the approach in question in the context of humanitarian aid will, among other arguments to be presented in chapter six, show to be valuable for challenging this view.

So as we have seen, the self-evident topic of data/information quality has been in the centre of the academic discussion whereas little understanding and prejudice (bias) have been overlooked, particularly prejudice. As it will be approached in chapters five and six, the case for data/information quality is indeed an issue as it is an important feature for the maintenance of a

88 [<http://irevolution.net>].

89 *Meier* (2010; 2013).

90 [<http://www.sail-labs.com/home.html>].

91 *Backfried*, *Göllner*, *Quirchmayr*, *Rainer*, *Kienast*, *Thallinger* & *Peer* (2013).

92 To be approached in theoretical framework.

93 *Hutchins* (1995; 2000).

wider system of order. Withal the fact that it is not an issue exclusive to crowdsourcing or citizen science is crucial and has been widely neglected, hampering in depth inquiries on the topic.

The seminal work of Ravetz and Funtowicz⁹⁴ on uncertainty in science (focusing on environmental issues) teaches us how uncertainty has been concealed within the field of knowledge which is supposed to provide the world with “the truth” or at least with undeniable data/information quality and elucidate what is the meaning and the role of data/information quality in contexts of uncertainty and complexity.

Ravetz’s work has a considerable influence on the course that this thesis has taken during analysis, once it was the awareness brought by his articles on the myth of certainty in science, especially concerning issues of the social and environmental realm (main focus of this thesis, as they are the pillars of the SDG) that has led the inquiry to focus on a higher level of abstraction, as the possibility that data/information quality was alone the cause of the phenomenon in question was excluded.

Foucault’s ideas on subjugated knowledges and genealogy (focused on the discipline of history)⁹⁵ as well as Ravetz and Funtowicz’s thoughts on deep uncertainties and the plurality of legitimate perspectives⁹⁶ (focused on the field of environmental governance), both reflecting on the complexity of knowledge systems, have inspired the present inquiry as the approaches crowdsourcing and citizen science elegantly fit the discourse on complexity, uncertainty, consideration of subjugated knowledges, trust and the notions of more data and better data from the data revolution discourse and also relating to Ravetz and Funtowicz’s conception of post normal science.

During the interviews’ analysis and literature research, it was possible to determine that the trust in organizations, being “science” or “academia” one of them, seems to be a relevant point shaping the general level of concern with the verity of a given information. There is a vast literature on the fields of trust, reputation and credibility, crossing a variety of fields and disciplines like philosophy, sociology, political science, economy and marketing. For the present inquiry, this literature has provided a valuable overview of the landscape on the named topics, helping us better understand how trust in organizations is built and preserved, disclosing in parallel to the outcomes from interviews’ analysis the key role of accountability within the context.

Literature on accountability, as the subject has been lately regarded as “hype”, is too, very rich across different disciplines (organizational theory, philosophy, international relations, political science, etc.) and fields. Such fields are formed according to the level, type and direction of the accountability flow⁹⁷, characterizing accountability as a multifaceted phenomenon.⁹⁸ The most relevant fields of study on accountability in relation to what will be addressed in this thesis are:

94 Funtowicz & Ravetz (1990; 1994).

95 Foucault (1980).

96 Funtowicz & Ravetz (1990; 1992; 1993).

97 To be approached in the theoretical framework (section 3).

98 Patil, Vieider & Tetloc (2014).

accountability of NGOs (mostly INGOs)⁹⁹; accountability and volunteers¹⁰⁰; accountability, performance and autonomy¹⁰¹; inter-organizational accountability¹⁰² and accountability and trust¹⁰³.

It is noteworthy that the subject of trust has also gained more attention in the last couple of years along with the emergence of new technologies and concepts emanating from it. Nearly all¹⁰⁴ collaborative practices characteristic of the Network Age¹⁰⁵ (or Network Society¹⁰⁶) and part of the so called Collaborative Economy, are based rather on trust relations than on accountability relations (default in organizational scenarios). In contrast, the open data movement also characteristic of the Network Age and the Collaborative Economy and particularly, one of the requirements of a data revolution, demands primarily accountability from the part of organizations towards the general public and other organizations. In this context, accountability is held as a premise for the establishment of trust.

Michel Bauwens and the team from the P2P (peer-to-peer) Foundation have been making an exceptional contribution through their work with a wiki¹⁰⁷ and a blog¹⁰⁸ not just to the practical aspects of the Collaborative Economy but also to the theoretical discussion, being the main source informing this inquiry on the topic. In the report “Synthetic Overview of the Collaborative Economy”¹⁰⁹, one will find a great amount of useful information, including the place of crowdsourcing within this framework that will be explained in chapter three. Complementing this main source, many other web resources have provided valuable material and a better grasp of the field of collaborative economy, which has shown to be meaningful for this work in terms of contextualization (paradigm shifts) and comparisons regarding trust and accountability relations.

The contrast disclosed above regarding the discourse on a data revolution, between quasi-conflicting processes and principles and combined with insights from the work of Onora O’Neil and others¹¹⁰, on trust and accountability will show to be, along with the literature on uncertainty and data/information quality, as previously mentioned, the bottom line of what will be disclosed by the end of this work as a final hypothesis.

In BBC’s Reith Lectures’ series named “A Question of Trust”¹¹¹, O’Neill made her landmark in the field of trust as it has shown to be a turning point within the discourse on the topic, reshaping philosophical and political agendas. O’Neill does also approach the issue of “professional

99 Najam (1996); Jordan (2005); Agyemang, Awumbila, Unerman & O’Dwyer (2009); Saxton & Guo (2011).

100 United Nations Volunteers (2013).

101 Patil, Vieider & Tetloc (2014); Veeder (1991); O’Neill (2004); Wilkins (2011).

102 Szazi (2009).

103 O’Neill (2002; 2013) and others to be mentioned in section 3.

104 E.g.: sharing information (photos, status, etc.) in social networks like Facebook, Twitter and Instagram; products and places’ (restaurants, hotels, films, books, etc.) rating and/or review in different websites; OSS (open source softwares); FabLabs (space for sharing hardware and skills).

105 UN-OCHA (2014).

106 Castells (2010).

107 [http://p2pfoundation.net/Main_Page].

108 [<http://blog.p2pfoundation.net>].

109 Bauwens, Mendoza & Iacomella (2012).

110 O’Neill (2002a); Bovens (2005); Edelenbos & Eshuis (2011:23); Adelberg & Batson (1978); McLaughlin & Riesman (1986); Jackall (1988:77-82).

111 O’Neill (2002a).

autonomy”¹¹² in relation to trust and accountability as well as the conception of informed consent¹¹³. These will too show to be of primary importance for this thesis. The philosophy of trust and accountability will be further discussed in the theoretical framework and may be considered as part of the thesis’ argumentation.

Organizational theories, particularly Weber’s work on bureaucracy¹¹⁴ and Barkin’s work on IOs (International Organizations)¹¹⁵ support the development of the studies mentioned in the above paragraphs and Searle’s theory of social ontology¹¹⁶ along with premises of the fields of philosophy of language and semiotics, provide the basal foundation behind the very existence of organizations, institutions and what else is part of our shared reality: continuous verbal agreements perpetuating a given perception of this reality. This knowledge may be the key for shaping the future of crowdsourcing and citizen science, beginning with the context of a data revolution. The theoretical framework to be presented in the end of this chapter will provide a more comprehensible overview on these topics and theories.

2.4 Methodological Approaches

2.4.1 Data Collection

“The initial stage of data collection depends largely on a general subject or problem area, which is based on the analyst’s general perspective of the subject area. The initial decisions are not based on a preconceived theoretical framework.”¹¹⁷

Observation and Field Notes

As I have concisely mentioned in section 2.2, I have during the research process, particularly during its first phase, collected data in form of notes through the observation of presentations, workshops and informal discussions during the Citizen Cyberscience Summit as well as through the observation of weekly virtual meetings on Citizen Science.

In addition I have also compiled valuable notes from Skype conversations and Email exchanges with engaged members of the community working within the fields of crowdsourcing and citizen science¹¹⁸, especially those engaged in the project for forest monitoring via crowdsourcing named “Forest Watchers”¹¹⁹ (which, as mentioned, I have dropped as a case study

112 Ibid. O’Neill (2002b).

113 O’Neill (2001).

114 Weber (1978).

115 Barkin (2006).

116 Searle (1995).

117 Glaser & Strauss (2012).

118 Such as Patrick Meier (Qatar Computer Research Institute – QCRI), Andrea Wiggins (University of Maryland), Mucki Haklay (UCL), Niklas Hadelberg (UNEP), Francois Grey (Citizen Cyberscience Centre), Daniel Gonzales (Citizen Cyberscience Centre), Gerhard Backfried (Sail Labs).

119 Fernando Ramos, Eduardo Luz (INPE, Brazil).

due to the necessity of answering the question posed in the present work), as well as with professionals of other [related] fields such as big data¹²⁰, uncertainty in science¹²¹, community-based environmental monitoring¹²² and collaborative economy¹²³.

The notes comprised general information as well as key words to be searched for at a later point in electronic databases, insights and hints concerning research directions, relevant literature, websites and prominent people and projects of the field.

All the input provided by these very knowledgeable people¹²⁴ has provided me with priceless perspectives of extended contexts which do play a role in shaping the [non-profit] crowdsourcing and citizen science's landscape or/and in which the latter have a potential role to play.

Articles and Documents

In addition to a substantial number of articles from academic journals and from other online newspapers, chiefly from the main stream media, I have consulted many official websites from different UN agencies and INGOs where I was able to find relevant reports, brochures, newsletters, policy documents, maps and key statements, which I would recall at a later stage for referencing. Yet, three reports have become central to the argument presented in this thesis: the IEAG report on data revolution¹²⁵, the synthesis report of the Secretary-General on the post-2015 agenda¹²⁶, and the report of the high-level panel of eminent persons on the post-2015 agenda¹²⁷. In addition I have often consulted the report and analysis I have myself prepared on the Citizen Cyberscience Summit 2014.

For organizing and keeping track of the articles from academic journals (in PDF format) which were retrieved via the VPN¹²⁸ of the university, I have used the free reference manager software "Mendeley Desktop"¹²⁹. For all the pertinent websites (including online newspaper's articles and official organizational web resources) I have encountered along the research process, I have used a very convenient Google Chrome extension named "Session Buddy"¹³⁰.

Individual Semi-structured Interviews

A total of nine semi-structured interviews were conducted via Skype in different dates between February and May 2014 with experts on the field of crowdsourcing (to be referred to as "expert interviewees") and of related fields which may potentially adopt the approach in the future (to be

120 Dirk Helbing (ETH Zurich, FuturICT).

121 Jerome Ravetz (Oxford University).

122 Nina Kantchewa (UNDP).

123 Michel Bauwens (P2P Foundation).

124 Above mentioned.

125 IEAG (2014).

126 Ki-Moon (2014).

127 The Report of the High-Level Panel of Eminent Persons on the Post-2015 Development Agenda (2013).

128 Virtual Private Network.

129 [<http://www.mendeley.com>].

130 [<https://chrome.google.com/webstore/detail/session-buddy/edacconmaakjimmfgnblocblbcdcpbko>].

referred to as “non-expert interviewees”). The interviewees are prominent players in the international scenario, occupying relevant positions inside international INGOs (four of the interviewees) and UN agencies (also four)¹³¹. The two last organizational spheres (including non-international NGOs) plus governments (also as a whole/institution), will be addressed in this thesis as “actor groups”. In Annex II one may find the complete list of interviewees along with the respective short profiles and information regarding the record and/or the interview’s circumstances.

Considering that the interviews were “discover-oriented”¹³², since the goal was both to identify the perceived challenges of crowdsourcing and citizen science and to broadly approach the topic in order to accomplish a more ample and deep-seated landscape of the field based on the experiences of the interviewees, they have been conducted in a semi-structured manner based on open-ended core questions (formulated to all the nine interviewees). Additionally, an introductory question regarding the interviewees’ backgrounds and current occupation was formulated.

Interviews were in average forty-five minutes long (being the shortest about twenty-three and longest about seventy-three minutes long) depending on the availability of the interviewee. A consequence from open-ended questions is that time may become an issue. Thus in some occasions, particularly when interviewees had a very limited slot of time available, I have chosen to skip peripheral questions for the sake of a more complete formulation of the interviewees’ answers to the core questions.

Most of the interviews were recorded (.mp3 format), with exception of those¹³³ affected by “bad connectivity”. For the former, audio files are available for reference upon request.

As stressed, the main goal of the interviews was to explore the field from the view point of experts and related professionals (non-experts) and ultimately to identify the reason behind the phenomenon concerning a reluctance from the part of organizations in acknowledging [non-profit] crowdsourcing and citizen science approaches as valid data/information sources.

For the sake of a more pragmatic approach (at least in a primary phase as it will be explained), two core questions present in all the interviews (excepting *Levine* who was just asked the second core question due to time constrain), were formulated as follows: (1) Which of the three actor groups of concern to this study (NGOs, UN and governments) is more likely to act positively toward crowdsourcing and citizen science approaches and why?¹³⁴; (2) Which are the most frequently named issues of these approaches¹³⁵ that may be hampering wider acceptance and adoption, and what are the proposed respective potential solutions?

In the length of this work there will be references to quotes to the audio records, which will be referred to as for instance: *AV: 12”05’* - being AV the short form for Andrej Verity, xx” the minute and xx’ the second of the audio record where the passage starts. The short forms referring

131 Patrick Meier works neither for an INGO nor for the UN but is often working in collaboration with them.

132 Guion, Diehl & McDonald (2011).

133 Salem Avan (SA).

134 By formulating the core question I did not mention the “non-profit” aspect because all the interviewees were aware that I was making reference to this specific kind of crowdsourcing approach as most of them do work with the latter or within humanitarian or environmental fields.

135 Crowdsourcing and citizen science.

to each interview can be found in Annex II. Notes of the interviews and audio records may be accessed upon request via Email to the author.

2.4.2 Analytical Strategies

Analysis was carried throughout this work in accordance with guidelines provided by the informed grounded theory method, being permeated in all levels of analysis by a process of constant comparison and systemic linkage.

Interviews: partial coding and categories

In order to create categories and then concepts out of interviews' data, I have firstly, complemented (by listening to the audios carefully), my notes taken during and after the interviews. From this point, it was already possible to identify some preliminary categories, relying mainly on the support of the two interviews' questions. In order to be able to refine the latter, I have heard all interviews once again while transcribing only those passages relevant to such categories, forming a sort of summary. The summary composed of the most significant quotations of each interview has eased the process of further refining categories primarily through the comparison between interviews.

Conceptualizing

In a further step categories resulting from partial coding (as above described) were confronted with other empirical data. As Charmaz states, the emerging analysis may lead to adopting multiple methods of data collection and to pursuing inquiry in several sites.¹³⁶

Apart from data collected prior to interviews such as during informal conversations and other events such as during the Citizen Cyberscience Summit and others¹³⁷, the majority of the literature informing this work (books, journal articles and reports) was collected during the analysis of the interviews' emergent categories in an open ended manner, representing one of the main characteristic of grounded theory methods where there is no separation between the process of data collection and analysis as both happen in a fluid back and forward process grounded on comparative analysis. This process of systematic data analysis and constant comparison, allows categories to be transformed in abstract analytical concepts which will eventually support the development of the final hypothesis.

Theoretical Sampling: going meta

“Successive levels of abstraction through comparative analysis constitute the core of grounded theory analysis.”¹³⁸

¹³⁶ Charmaz (2014:13).

¹³⁷ See section 2.4.1.

¹³⁸ Charmaz (2014:320).

Despite of my inclination to phenomenology, I have initiated the inquiry based on a rather pragmatic approach (in the second interview question more than in the first) through the questions posed to interviewees. These, as already mentioned in the introduction, have become the sub-research questions.¹³⁹

Considering that the majority of interviewees has either shown not to be well acquainted (minority) with the term citizen science and/or did not feel confident in answering for this field, I have in the course of the interviews, despite of referring to both “crowdsourcing and citizen science” in the introductions and in the formulation of the core questions in most of the interview, impromptu decided if I would or would not drop out the term citizen science for the sake of the communication flow, what I have done in some cases. I have during interviews, firstly addressed both approaches for then starting to refer solely to crowdsourcing aiming to ease communication. Despite of this fact, I consider the outcomes of the interview’s analysis and of the present work in general, applicable to both conceptions: of crowdsourcing [non-profit] and citizen science. This is because the core issues identified during research are directly related to specific elements of [non-profit] crowdsourcing which do also apply in many cases to citizen science (particularly, but not only, in crowd-science): the anonymous character of contributors and the very large number of collected data/information.

Moreover, I do also argue that citizen journalism (based on the same principle as citizen science) and other participatory monitoring activities (e.g. participatory forest monitoring), which do not characterize neither as crowdsourcing nor as citizen science, for there is no scientific output, are too impacted by the same prejudices, thus displaying the same challenges as the others. Nevertheless I will in this thesis, keep the discourse on “crowdsourcing and citizen science” for the sake of the flow and comprehensiveness of the text.

Each time a by an interviewee pointed challenge has been confronted with a sensible solution or counter argument, the “factual discourse” has shown to be fragile; the phenomenon in question did not seem to be solely a consequence of the practical justifications or challenges stressed by interviewees, particularly permeated in the discourse of non-experts of the fields of crowdsourcing.

This assumption has finally driven my attention back to phenomenology, as it alludes to the necessity of “going meta”, that is, of bringing the process operating behind the phenomenon to a higher level of abstraction and interpretation, or meta-level, in order to be able to grasp the full picture and ultimately to enable actors to deliberately influence the process (be it through reformulating the discourse or through more practical strategies) for eventually being able to reverse the phenomenon.

Towards the elucidation of “a full picture” and aiming for a “theoretical saturation” which would not be accomplished due to the constraints of a MA thesis¹⁴⁰; I have through inductive and

139 According to Charmaz, in grounded theory, a general research topic informs initial methodological choices for data collection - (Charmaz 2014:320).

140 As I have previously mentioned, going back to the preliminary categories or even to the raw data of the interviews would have been necessary for theoretical saturation, but out of the scope of this work.

abductive reasoning decided where to collect the next data based on the outcomes from the constant comparisons and data analysis, progressively assembling the theoretical framework, to be presented in the next chapter.

3 Theoretical Framework

Due to the number of theories informing this thesis and to the limited scope of the letter, to account for a full explanation of each of the theories comprising the framework is not suitable, therefore, when possible¹⁴¹, concise and comprehensible summaries will be provided. It is relevant to note that this framework took form along with the research process as a result from theoretical sampling and all the theories or theoretical frameworks constituting it are not just indispensable for assigning meaning to the following chapters, but may also be considered as part of the argumentation towards the hypothesis itself, justifying the length of this section.

3.1 Philosophy of Language, Semiotics and Searle's Social Ontology

Here, I refer not to one theory but to a theoretical framework in itself, comprising Searle's theory of social ontology and speech acts and the disciplines of semiotics and philosophy of language. The latter represents in turn, alongside with "systems thinking" the most basic notions supporting the rationale of this thesis and which, with the support of other theories, constitute a further theoretical framework (to be presented throughout this section) informing the present work. Such basic notions, have in opposition to the other theories to be presented next, which have emerged as part of the inquiry during the process of analysis (characteristic of the grounded theory method), played an influential role since the very initial phase of the research process as it was explained in section 2.2, regarding reflexivity.

This framework perceives language as being the foundation of social reality (social facts and social institutions). Semiotic is considered by some as being a branch of linguistics (science of language) and for others, exactly the opposite, it would be the considered "the great field" and linguistics would be its branch. However its approach is closely related to social facts and the creation of social reality, similarly to the field of philosophy of language. The essential idea found in this discipline is not new; Hobbes for instance, was the first to perceive already in the seventeenth century, the social reality or "commonwealth", as he called it, as a collective human construction. It is all about signs and things, idea which in the history of philosophy, has been considered by Plato and Aristotle and later, in the nineteenth century, has been approached under the lens of semiotics and/or semiology by Charles S. Peirce and Ferdinand de Saussure. The subject has demonstrated to be so relevant that it could not be kept in one scholar tradition, thus it has become natural to watch linguists starting to read about logic structuralism and social sciences, and the social scientists and philosophers getting interested in the Saussurean theory. Until today, semiotics and the philosophy of language are separated by a fine line, if there is one. In a sense, the difference lies between separate traditions rather than subjects.

In an over simplified explanation of Searle's theory of social ontology concerning institutional structures, individuals do collectively construct the social reality in which they are inserted, through continuously renewed verbal agreements (in alignment with the framework of symbolic

141 The section regarding [modern] accountability is an exception, as full grasping of this theoretical framework is key for the argumentation supporting the final hypothesis.

interactionism¹⁴²), which may have been initiated in the past through a declaration (form of speech act¹⁴³) uttered by an individual, who has in that given moment, performed, empowered by her/his previously assigned function (result of the same process), a collective intentionality. The following quotes illustrate Searle's stand with this regards:

“[...] the secret to understanding the continued existence of institutional facts is simply that the individuals directly involved and a sufficient number of members of the relevant communities must continue to recognize and accept the existence of such facts.”¹⁴⁴

According to Searle, the interaction between social realities are “systematic relationships” (e.g., governments, marriages, corporations, universities, armies, churches) which constitute a multi-layered social reality.¹⁴⁵

For the purpose of elucidating the role of this theoretical framework in the construction of the argument of the present thesis, it is appropriate to approach Fiorin's¹⁴⁶ conception of a “generative path for meaning”, consisting in three layers: the deep level (immanent), the narrative (manifestation, can also be understood as a state of latency), where values are still found in modal and cultural objects, and the most popular nowadays, the discursive (level of expression), which is divided in two modes: the semantic of discourse, which operates themes and figures in order to achieve the concretization of a meaning; and the syntax of discourse, in which, the enunciator, through operations of “actoralizing”, “temporalizing” and “spacializing”, overlays the enunciated narratives. Complementing this rationale, Denis Bertrand¹⁴⁷ refers to a “methodological simulacrum”, which results from the perception of the fact that the very same element of the deep structure, can appear in multiple ways on a more superficial level (e.g. the term accountability).

In the context of this work, this theoretical framework will show to be crucial, for that the conceptions underlying latent paradigm shifts are supposed to be easily negotiated as they lie still within the generative path for meaning, most typically between the narrative and discursive levels and even, in a lesser extent, in the deep level.

Furthermore the construction of a theory or a hypothesis through grounded theory methods may be likewise seen as being founded on a generative path for constructing meaning, as conceptions of a higher level of abstraction or deep level (immanent) are brought to the level of narrative aspiring to become part of the discourse for ultimately concretize meaning.

To conclude, one more aspect of this thesis which may benefit from the awareness of this framework is the issue of little understanding, to come up during interviews' analysis, and which is also related to discourse in form of written standards such as terminologies and typologies (classifications/categorizations), topic to be approached in chapter three along with the elucidation of core concepts.

142 Glasse & Reynolds (2003); Stryker (1968).

143 Searle (1995).

144 Ibid. p.117.

145 Ibid. p.97.

146 Fiorin (1988).

147 Bertrand (1989:8).

3.2 Organizational Theories

3.2.1 Weber's Theory of Bureaucracy

Weber's theory of bureaucracy, ruling structure of most of organizations and institutions today, provides the basis for discussing theories and conceptions that follow in this section. The fundamental attributes of a bureaucratic system are hierarchy of authority, division of labour, extensive rules, separation of administration from ownership, hiring and promotion based on technical competency and efficiency.¹⁴⁸

“Experience tends universally to show that the purely bureaucratic type of administrative organization is, from a purely technical point of view, capable of attaining the highest degree of efficiency and is in this sense formally the most rational known means of carrying out imperative control over human beings.”¹⁴⁹

In the above quote, Weber makes his view point. First by unveiling his belief, which holds bureaucracy as the most efficient form of organization, also an inevitable fate¹⁵⁰; and second by acknowledging that bureaucracy is the ideal mean for exercising control over human beings, limiting their freedom. Both acknowledgements are focal points of endless discussions. Moreover Weber has further elaborated his thoughts with regards to the latter argument, on control and limited human freedom, by coining the term “iron cage” for depicting a scenario where the excess of typical bureaucratic characteristics (teleological¹⁵¹ efficiency, control, accountability and rational calculation) would trap individuals in a systems where individuality and autonomy (thus creativity) would be sacrificed leading to a sort of “dehumanization” of society. The work of Michael Foucault on power and control within institutions, pervading in turn the whole society, is provocative and will be discussed in a separated short section concerning power and knowledge. This correlation is also highlighted by Weber who states that bureaucratic administration means fundamentally domination through knowledge.¹⁵²

In addition, Weber has also expressed his concerns on a further issue: the bureaucratic potential for supporting oligarchies, as bureaucracies concentrate large amounts of power in a small number of people and are generally unregulated.¹⁵³

It is also noteworthy that the goal-driven character of Weber's bureaucracy does drastically differ from the conception of collaboration (central concept for this thesis), for that in the latter all parties share exactly the same goal (common goal) whereas in the former there are individuals with various personal goals (often: to climb up the hierarchy or to keep their jobs for financial security) who are recruited to pursue the goal of the organization in a form of cooperation.

¹⁴⁸ Weber (2009).

¹⁴⁹ Ibid. p. 337.

¹⁵⁰ Weber (1978:1403).

¹⁵¹ According to the Oxford Online Dictionary, teleology means: “The explanation of phenomena by the purpose they serve rather than by postulated causes.” Retrieved from: [<http://www.oxforddictionaries.com/definition/english/teleology>].

¹⁵² Swedberg & Agevall (2005).

¹⁵³ Kendall, Murray & Linden (2004).

Finally, in order to assign meaning to the theory of bureaucracy in the context of this thesis, it is paramount to discuss how do the fundamental attributes of this system relate to incentive theory (on an individual level) and consequently to the conceptions of risk avoidance and risk transfer, blame and punishment (multi-level).

3.2.2 Incentive Theory

Incentive theory is possibly the most cited from the motivational theories and comprises intrinsic and extrinsic forms of motivation. Examples of intrinsic motivational drivers are: passion (real enjoyment by carrying out a task), curiosity, altruism and also fear, for instance for the consequences of climate change.¹⁵⁴

In addition to the fundamental attributes of a bureaucratic systems disclosed in the beginning of this section, it is relevant to add that bureaucratic structures do in general rely on extrinsic motivational drivers. Extrinsic drivers, also called extrinsic motivations are characterized by positive and negative reinforcements which may be tangible or intangible. As an exception there is the case of external pressure (mostly moral but also financial) as a motivational trigger, which may not be characterized as a reinforcement, once arises through the fear of a potential negative reinforcement or through social pressure.

Positive reinforcement encompasses financial or other material rewards and also intangible rewards such as gain or maintenance of reputation and/or credibility (social recognition). Both are accredited to an individual through external recognition or praise (e.g. compliments, certificates), particularly if made public (also including leader-boards in induced competition contexts).

Withal the negative reinforcements are those of higher interest for this thesis as the instance of negativity bias is taken into account. Negativity bias is a twofold phenomenon, referring firstly to the scenario where people and its collective forms (e.g. organizations or institutions) use to disproportionally and severely condemn other's failures, whereas other's success remain widely unacknowledged and unpraised, even in cases when such success is overall considered to be greater than the failures.

The second scenario is likely to be highly affected by the first and refers to the case where the majority of people, who when facing a decision involving risk (uncertain scenarios), tend not to take the risk, once while reflecting on whether or not to risk, they use to give more weight to potential costs of an unsuccessful outcome than to the potential gains of a successful one¹⁵⁵. But why would people tend not to risk in situations when the likelihood of a positive or negative "external" outcome is virtually the same?

In order to explain this tendentious behaviour, an individual perspective may be taken into consideration. For instance, if one considers potential gains and costs on a personal level, related to positive and negative reinforcements, another determinant emerges in the equation informing decision making: the weight of the *status quo*. If the latter is considered by the individual as being

154 The latter is advocated by Beck (2011) as being a new driver for cosmopolitan projects, as she discuss cosmopolitanism based on global fears.

155 Kanouse & Hanson (1972); Costantini & Hoving (1973); Wells, Hobfoll & Lavin (1999).

“good enough” or “comfortable enough”, not achieving excellence, thus not being awarded with positive reinforcements, will not be considered as disastrous as failing and being blamed, as the attribution of blame (especially if it becomes public) functions as a sentence ensuring shame and punishment. Punishments, or negative reinforcements, are related to the removal or the decrease of a stimulus (e.g. loss of a job or of reputation and credibility).

Furthermore the prejudice of the observers, elucidated in the first scenario where negativity bias is manifested, does play a fundamental role in influencing the choice of the individual standing before uncertain outcomes, giving even more weight to the “blame scenario”. Hence one may say that blame weights more in decision making under uncertain circumstances than praise, once in opposition to the latter, the former, depending on “its weight”, has the potential to destroy reputation and credibility which could have been a result of years of work. The loss of such social attributes (reputation and credibility) may be perceived in this situation as being as bad as being fired, characterizing the “ultimate punishment”, whereas in opposition, the ultimate reward would be getting a promotion.

Thus from this perspective, the “real risk” concerning a potential unsuccessful outcome could potentially refer to the risk of blame¹⁵⁶ on a personal level, but also to institutional/organizational levels, as the rationale can be extended considering that institutions and organizations, as entities, do also manifest negativity bias in decision making; although they cannot be fired or promoted, such bodies are extremely affected by praise and particularly by blame, for that reputation and credibility affect directly the power of discourse in the inter-organizational scenario.¹⁵⁷

Furthermore blame avoidance behaviours may be traced at both levels also simultaneously, being sometimes difficult to determine the source of hesitation and/or resignation, which is also likely to be twofold. It is noteworthy that bureaucracy based organizations are a collective of individuals organized in vertical hierarchies through which power flows, thus reinforcements do normally flow in a top-down manner. Nevertheless, along with the “hypeness” of the notion of [modern] accountability¹⁵⁸ regarding organizations and institutions today, blame attribution can also come from the bottom (public accountability) or it can be horizontal characterizing inter-organizational accountability¹⁵⁹. Notions of accountability (trust and control) will be discussed in section 3.3.

3.2.3 Risk Avoidance, Risk Transfer and Blame

“One is that it all comes down to individual personalities, with those who wish to expose themselves to as little downside blame risk as possible tending to follow the minimax approach and those who are more disposed to gamble over blame risk making different choices.”¹⁶⁰

156 Hood (2010).

157 Conception to be discussed further in this section.

158 To be explained in the next section.

159 Conception related to the power of discourse in the global scenario.

160 Hood (2010:74).

Much is discussed on the issue of risk management, however few scholars speak of blame, even though blame, as we have seen, is likely to be as relevant as external risk concerning a given task or a decision which is to be carried out. By carefully considering the fundamental attributes of bureaucratic structures, the case of blame becomes even more relevant. Hierarchy of authority and hiring, promotion and firing based on technical competency and efficiency, frame the ideal stage for the case of blame. One of the characteristics of this system is constant oversight, the basic mean for control. All mistakes will be identified, assessed and sentenced and as a consequence individuals become, based on the principle of negativity bias clarified above, risk averse.

This situation, characterizing excess of accountability which is perceived by many as synonym to potential punishment¹⁶¹, constrains individual freedom and professional autonomy¹⁶², hampering creativity and leading to poor problem solving as individuals are compelled to avoid risk.¹⁶³ Risk averse individuals will avoid risk either by: delegating the job to somebody else, usually a subordinate or through outsourcing¹⁶⁴, being both forms of risk transfer; or by relying on manuals, books and computer programs, that is, through excessive proceduralism (playing it by the book) or through what Hood calls protocolization¹⁶⁵:

“Rather than allowing common sense or ad hoc professional judgment to govern what is to be done, appropriate behaviour is stipulated by formulae, algorithms, computer programs, best practice guidelines, or other kinds of rules, turning human functionaries into some approximation of robots.”¹⁶⁶

The latter is also a form of risk transfer, although risk is in this situation transferred not to another accountable entity but to bodies of information and knowledge, which represent the ruling system itself, making them “unquestionable”. In this scenario accountability, thus blame, “fade into nothingness” and the problem is considered solved. This is a highly abstract and complex phenomenon which relates to other major systems. Hood explains it in a higher level of abstraction and potential scaling of this “harmless procedure”:

“Discretion can be removed from office holders or operators by physical or electronic mechanisms as well as by rules, codes, or guidelines. Indeed, the logical conclusion of the protocolization approach, far from uncommon in the front-line blame avoidance world that we discussed in chapter 2, is to build the rules into machinery or computer software physically such that humans cannot readily override them. Such an approach relies on what Lawrence Lessig (2000) terms ‘architecture’ as a mode of control. Designing decision processes that way produces

161 Behn (2001:3).

162 Weber (2009); O’Neill (2002).

163 O’Neill (2002); Papadopoulos (2012); Adelberg & Batson (1978); McLaughlin & Riesman (1986); Jackall (1988); Bovens (2005); Behn (2001:11).

164 “Obtain (goods or a service) by contract from an outside supplier” - Oxford Online Dictionaries: [<http://www.oxforddictionaries.com/definition/english/outsource?q=outsource>].

165 “[...] protocolization is the policy strategy equivalent of delegation in removing the possibility of blame for an individual’s judgment (and is often used by front-line or middle-level players for whom delegation is not possible).” - Hood (2010:96).

166 Ibid. p.93.

systems that are ‘no hands’ in a literal sense: if decisions are made by machines rather than by the exercise of human judgment, it is harder to attach blame to human agents (other than the usually anonymous system designers).¹⁶⁷

Another very common strategy for avoiding blame, at least in what concerns moral judgement, thus loss of reputation or credibility on an individual level (in this case the organization would still not be blame-free), is to look for safety in numbers, that is “stick to the group”¹⁶⁸. This understanding is also very useful for throwing some light on phenomenon such as the one central to this thesis, when there is reluctance for adopting innovative strategies. As we know, the first to enter new unexploited terrains are always those exceptional or hopeless individuals. The rest will play safe and wait for everybody.

Nevertheless with respect to organization, the inside strategy, typical from bureaucratic structures rely on the opposite rationale, *individualizing blame instead of allowing it to be attributed to systems, powerful organizations, or those who direct them*.¹⁶⁹ On another level, organizations too “stick to the group” when concerning other organizations, following the same rationale applied at the micro level by individuals.

To conclude the topic on risk avoidance and transfer, it is important to note, for the purpose of raising criticism, that at an organizational level, risk is assessed through weighting costs and benefits, more than often, based exclusively on economic indicators as outcomes from interview’s analysis have shown¹⁷⁰ and as Felt and Wynne highlight when describing the European scenario:

“Put simply, all that remains to be clarified as grounds for a ‘decision’ (once risk assessment has established the scientific facts) is an evaluation of what constitute the acceptable ‘levels of protection’. This in turn is typically based on a rigidly pre-set model of the relationships between ‘costs’ and ‘benefits’, generally framed in exclusively economic ways.”¹⁷¹

3.2.4 IOs, INGOs and NGOs

Organizational theorists have been working extensively on IOs, NGOs and INGOs, attempting to make the structures upholding this forms of organizations clearer in order to better describe their performative functions at global, national and local levels. Nevertheless the literature on this topic is immensely extensive, so only those works¹⁷² addressing specific topics raised during the research were taken into account.

One of the pragmatic research questions (addressed during interviews) refers to organizational behaviours vis-à-vis crowdsourcing and citizen science as data/information source. Outcomes of

167 Ibid. p.95.

168 Ibid. p.100.

169 Ibid.

170 Also in interplay with hierarchical and multi-party accountability (e.g. donors – UN agencies).

171 Wynne & Felt (2007:32).

172 Barkin (2006); Szazi (2009:44); Miller (2002).

interviews' analysis have outlined the main factors influencing decision making in uncertain scenarios at an organizational level. The identified factors to be elucidated in chapter five have raised the next topics to be researched, supporting in turn, the formulation of the final hypothesis: power, decision making and accountability (in different levels and directions).

Studies on NGOs stresses their role as both “watch dogs” and also as “working dogs”¹⁷³. The first concerns the important role NGOs have been playing since their emergence, such as on behalf of civil society, to criticize governmental policies and contribute with other ideas, that is, to influence policy making; and also to denounce irregularities and injustices at the local level to the government or to the news media in order to reach a broader audience. The second refers to NGOs which are not solely active within the plain of discourse, but also with regards to the implementation of practical solutions, such as designing and carrying out projects at the local level.

Back to the first role of NGOs, as “watch dogs”, a key question to be addressed is how does the communication of information, denouncing the inability of the government to handle a given situation or even the misbehaviour of governmental bodies themselves, to a broader audience influences organizational and institutional (IOs such as the UN and national governments) behaviour? By making the general public, the news media and even INGOs and IOs (depending on the gravity of the issue) aware of a governmental flaw or even crime, the former two will automatically turn to the national government looking for answers. This discussion will be carried out in the public sphere, that is, reports, speeches and other information will be made public either by organizations themselves or by the news media. In this way, the government in question will become the focus of attention and in consequence it will fear the possibility of being blamed and shamed, acting responsively. Most national governments have an array of agreements with IOs and with other national governments, accepting principles of multilateralism¹⁷⁴, thus due to this mutual accountability relation not honouring such principles may be considered a great shame.

“Shaming can be done by states, by nongovernmental organizations (NGOs), or by other civil society actors, such as news media. Whatever the source, as long as it embarrasses governments sufficiently that they change their behaviour in a way that brings them more in line with the regime, shaming has the effect of enforcing the regime.”¹⁷⁵

But what are the repercussions of shame to national governments? Why would it be a mean for enforcing the regime? Loss of credibility. Other national governments, IOs and also private investors, will hesitate to make new agreements with the given government which will turn out to be considered unreliable or untrustworthy. It reflects once more the micro scale, on an individual level as it was explained in the last sub-section (3.2.3).

The last paragraph has attempted to explain the role of NGOs and how do they exercise power. Nevertheless the described situation depicts a scenario where the issue is very critical, normally referring to humanitarian or environmental crimes. In such cases information will flow rapidly from

173 Barkin (2006).

174 Ibid. p.24.

175 Ibid. p.46.

the local to the global level, engaging international news media, INGOs, IOs and other national governments. Each of these organizations has a different function while exercising power in the global arena. The case of INGOs is similar to that of NGOs, excepting in the scope of impact.

When not concerning a major issue, as mentioned, the information provided by NGOs may be limited to the locality (local government, local community and local news media, if any), changing the way negotiations are carried out, once although mutual accountability is present also at the regional and local levels (even on the inter-personal level), the distribution of power in such scenarios may be more uneven than at a global scale due to the typical [bureaucratic and capitalistic consequent] oligarchic control, most likely to be found in localities from underdeveloped countries with weak or none functional institutions.

INGOs in turn, act mostly at the “glocal” level. Glocal once they exercise field activities at local levels, but normally involve many parties at a global level, such as international news media, national governments and IOs, as donors (for projects) or as means of amplifying information for the purpose of international laws’ enforcement, again, as NGOs, through blaming and shaming accountable states or leaderships.

“A similar practice can be observed with regards to international NGOs (INGOs), which in the eyes of old-fashioned leftist governmental officials also carry the burden of being instruments of foreign interference in the country’s internal affairs (see, for example, the triennial renewal in Bolivia and Ecuador).”¹⁷⁶

The characteristic described above is particular to INGOs, as IOs are often prevented by multilateral agreements to intervene (often in the form of monitoring) in internal affairs of states, due to the principle of sovereignty.¹⁷⁷ Furthermore in contrast to NGOs, INGOs, by bridging the local with the global, hold a fair amount of what Barkin has called international embarrassment power¹⁷⁸ through moral authority¹⁷⁹ and reach (concerning information). It is paramount to note, that INGOs are themselves also accountable bodies (even if not based on formal agreements), meaning that holding this kind of power will highly depend on their reputation in the global arena. That is, they are unable to exercise this kind of power if they are not considered credible or trustworthy sources of information as their moral authority would be compromised. Based on the fact that INGOs on the contrary of the UN for instance, do not participate on multilateral agreements along with national governments, thus neither states are officially/formally accountable to INGOs themselves, nor the other way around; and also based on the principle of negativity bias, it is possible to conjecture that the information-based power INGOs can hold is extremely sensitive as one noticeable flaw may be enough for the loss of the reputation of the organization. This topic will come up during interview’s analysis, once more, highlighting accountability as a major variable defining organizational behaviour towards crowdsourcing and citizen science while considering that based on

176 Szazi (2009:44).

177 Note that some field monitoring can be nowadays carried through remote sensing techniques.

178 Barkin (2006:38).

179 Ibid. p.24.

bureaucratic models of administration, INGOs (and also IOs) tend to be committed to their own survival as institutions.¹⁸⁰

IOs, such as the World Bank, the UN, the IMF and others do, to an even wider extent than INGOs, hold power of international embarrassment through moral authority, notwithstanding it is relevant to note once more that more than often, IOs are initially informed by INGOs (or NGOs) as they are politically constrained to act in the locality due to multilateralism.

IOs' status as moral authorities, I argue, is not as sensitive to eventual flaws as it is the case by INGOs; for that in spite of being officially accountable to governments and to one another, these parties enjoy of some equity in the global arena, where minor flaws are often tolerated. There are many boundaries, to be taken into consideration in this complex scenario, which contribute to characterize a minor flaw. Issues of sovereignty, environment, human rights and others involving large amounts of financial resources are the most sensitive, thus prone to reproof.

Such power and accountability relations of different levels between organizations are useful when combined with the perspectives of bureaucratic principles, as mentioned above, also theories of risk avoidance and transfer, supporting the understanding of the whole, where some organizations are more inclined to take risks¹⁸¹ than others.

Findings of interviews' analysis will show to be compliant with such framework and existing literature on the field, also on a more specific level, concerning different variables (e.g. size and age of an organization) influencing NGOs and INGOs with respect to accountability and thus risk propensity.¹⁸²

In addition to the disclosure of information as a mean to enforce the regime, IOs have the control over and the ability to create information.¹⁸³ That means, through reports, official statements and recommendations, bodies such as the UN, along with epistemic communities, are highly influential in what concerns policy making, as they shape international agendas. They can create standards that affect the ways in which both governments and countries do business.¹⁸⁴

“Leaders of IOs, in their official capacities, speak with the authority of their organizations and can use that authority to put things onto the international agenda that might not otherwise be there.”¹⁸⁵

In alignment with the framework presented in the first section of this chapter (3.1) concerning semiotics, philosophy of language and Searle's theory of social ontology, one may assert that this kind of power, rooted in discourse is one of the most, if not the most influential form of power an organization can possess, as it does not only shapes political agendas, but realities. One example concerning the UN discourse on “sustainable development” has been provided in in the same section.

180 Ibid.

181 Here risks refer to act under uncertain circumstances, such as relying on crowdsourcing or citizen science data/information, as the latter are perceived as “not reliable”.

182 Luoma & Goodstein (1999); Hambrick & Finkelstein (1987); Berlinger & Te'eni (1999); McNutt & Boland (1999); Schneider (2003); Hackler & Saxton (2007); all former are cited *in*: Miller (2002).

183 Barkin (2006:34).

184 Ibid.

185 Ibid. p.24.

To conclude, the understanding of bureaucratic processes involving risk transfer (also in form of blame) and avoidance described in the last paragraphs, and which pervade multiple levels of administration, will show to be essential also for informing the argumentation regarding one of the main issues to be discussed in this work: the issue of data quality in crowdsourcing and citizen science.

3.3 Philosophy on Accountability, Trust and Control

As we have learned in previous sections, accountability does play a crucial role in this work as it was identified as the ultimate instance behind many generally perceived phenomenon and explanations emerging throughout data analysis. There are multiple ways of approaching the subject of accountability. Accountability flows vertically: bottom-up (e.g. in form of professionalism and citizenship) and top-down (e.g. open data policy - transparent organizations towards the general public or to other bodies placed lower in the hierarchy); and also horizontally (e.g. peer to peer accountability, which may also be considered as a natural trait, or inter-organizational accountability) in different levels: local (e.g. from the most basic relationships, as friendship or even among strangers) scaling up to the global spectrum (e.g. national governments-UN-INGOs). Hence for each combination between these levels and flows, there is a different perspective towards the subject.

The three most relevant approaches to accountability for the purpose of supporting argumentation throughout this thesis are placed at a higher level of abstraction and: (1) consider accountability as a natural trait; (2) relate accountability to trust and control; (3) and examines [modern] accountability underlying bureaucratic rationale within and between organizations.

The first, regarding accountability as a natural human trait, potentially supporting natural law and moral theories (or would it be a social construct?) as Adam Smith stated: *a moral being is an accountable being*.¹⁸⁶ Considering the following definition:

“Accountability is usually defined as a social relationship in which an actor feels an obligation to explain and to justify his conduct to some significant other”¹⁸⁷

An example supporting the case for accountability as a natural or moral law can be easily traced by analysing individuals’ behaviour not just within organizational hierarchies but also in other quotidian contexts, such as when somebody steps on someone else’s foot. The action of stepping on someone else’s foot makes the person who has stepped immediately accountable to the other (even when no pain is involved). If deeply analysed, in all instances where a “personal sphere” (tangible or intangible) is delimited, being the only “given” boundary, one’s own body, all actions considered as an intrusion of such “spheres” will demand accountability from the part of the intruder. This may be considered as a negative trigger prompting accountability, which can be deemed as linked to blame.

It is paramount to note that accountability (as defined above) can be the resultant not just of a negative, but also of a positive trigger: trust. As with accountability, it is still discussed whether or

¹⁸⁶ Smith (2010).

¹⁸⁷ Romzek & Dubnick (1998:89).

not trust is a natural human trait or if it is a social construct. Be as it may, both conceptions are nowadays deeply rooted in humans' behaviour, being generally performed as unconscious actions, that is, when they are functioning interchangeably. Whereas accountability will often be performed in tangible manners, be it through written, verbal or manifested actions, trust remains in an intangible plain. For instance, if Jim (trustor) trusts Tom (trustee) with a task, Tom, if a trustworthy person, will become automatically (morally) accountable to Jim.

However by pondering both variables of accountability, the negative and the positive, as a natural human trait (moral bound), one notes that the term "accountable (+ -ity)" may not be the most suitable for such characterization after all, for that it is etymologically related to the terms "to count" or "to reckon", being in turn, linked to the Latin verb "computare" (to compute; to calculate)¹⁸⁸, being a relatively modern concept with written citations barely in evidence before the early 19th century¹⁸⁹, approximately the same period when the term "bureaucracy" has been originated¹⁹⁰, shortly after the emergence of modern capitalism¹⁹¹. As Dubnick notes:

"In widely used dictionaries, the translation for accountable is responsible, a notable bow in the direction of meaning derived from standard English usage. Look up the French translation for 'accountability', however, and there is a more literal association with the Old French roots in the phrase la reddition de comptes – the rendering of accounts."¹⁹²

In contrast, first written registers of the term "trust" (noun+verb), date from early 13th century and relate to conceptions of help, confidence, protection, support, comfort and consolation. From the late 14th century it has being referred to as "confident expectation" and from the early 15th century on it has being also related to legal and business procedures¹⁹³ by the time that followed the fall of the manorial system, witnessing the emergency of the first elements which would constitute the modern capitalist system¹⁹⁴.

I find the link between notions of "trust" and "confident expectation" to be the most suitable for the context of the present theoretical argumentation, as it relies on the assumption of a "natural law" and concerns broader social relations beyond the very personal level. That being said, the potential counter-part for trust with regards to a natural relationship would refer to an action which aims "to fulfil latent expectations", instead of "to provide accounts". The same rationale may be applied to the "negative variable", as the trespasser¹⁹⁵ will be entailed to fulfil latent expectations for justification from the part of the affected individual.

188 Dubnick (2014:10).

189 Ibid. p.23.

190 "Bureaucracy (n.) 1818, from French bureaucratie, coined by French economist Jean Claude Marie Vincent de Gournay (1712-1759) on model of democratie, aristocratie, from bureau 'office', literally 'desk' (see bureau) + Greek suffix -kratia denoting 'power of' (see -cracy)" - Online Etymology Dictionary. Retrieved from: [http://dictionary.reference.com/browse/bureaucracy].

191 Burnham (2003); Encyclopaedia Britannica (2006).

192 Dubnick (2014:11).

193 Online Etymology Dictionary. Retrieved from: [http://dictionary.reference.com/browse/trust].

194 Marx (1867:875).

195 "Trespass verb (BREAK LAW): to go onto someone's land or enter their building without permission. Ex.: I hope this is a public footpath and we're not trespassing on someone's land."; "trespass verb [I] (NOT

As one may see, the two possible triggers of accountability, being the first presented instance entailed with negative sentiments, such as violation and threat as triggers and blame and potential punishment as a result (or repercussion); and the second, entailing positive sentiments such as help, confidence, protection, support, comfort and consolation as both triggers and resultants (characterizing mutuality¹⁹⁶), relate to instinctive emotions linked to self-preservation and safety.

Both aspects of accountability (positive and negative) entail risk taking¹⁹⁷. In the former, based on Deutsch's definition of trust as "the willingness to become vulnerable to another whose behaviour is not under one's control"¹⁹⁸, the act of trusting someone itself is considered a risk, thus here, risk is embedded in the trigger for accountability (for fulfilling latent expectations). In the latter, the individual taking the risk is the one violating someone else's private sphere, once the action of the one who has had his/her private sphere invaded is unpredictable; so in this case, the one to be later held accountable is the one taking the risk. This realization will be useful further in this section.

In agreement with the rationale outlined in the previous paragraphs, Dubnick argues that the historical emergence of modern bureaucratic organizations was a result of the accretion and institutionalization of *pre factum* accountability¹⁹⁹, what we will call "[modern] accountability".

[Modern] accountability is thus, based on natural human traits concerning self-preservation and human's social inclination for collaboration and cooperation, expressed through both positive and negative sentiments. The institutionalization of these relationships aiming to fulfil latent expectations was a form of reducing complexity and uncertainty, consequently risk in society, by means of regulatory mechanisms (control). These mechanisms were supposed to make both the trustee and the trespasser more predictable through the awareness of ongoing oversight and of the certainty of sanctions in case of misconduct (characterized by sets of rules and written procedures).

Nevertheless as individuals and the society as whole are well aware²⁰⁰, there is a limit to control, as in excess, it constrains individual freedom. From an organizational point of view, as O'Neill argues²⁰¹, excess of control will undermine professional autonomy (ultimately individual freedom), leading to poor decision making and problem solving. But not only. Scholars²⁰² advocate that excess of control does also weakens trust in society (in all levels): within and between organization, between organizations and the public and in interpersonal relationships. This assertion is compliant with the assumption that for the sake of a harmonious well-functioning social and moral world, a symbiotic and balanced relation between trust and control is essential.²⁰³

MORAL): old use to do something or act in a way that is not morally acceptable." - Cambridge Online Dictionary; Retrieved from: [http://dictionary.cambridge.org/dictionary/british/trespass?q=trespasser].

196 To be explained in the next paragraphs.

197 Luhmann (1979).

198 Deutsch (1962); Edelenbos & Eshuis (2011:648).

199 Dubnick (2011:709).

200 There are many examples where reactions to excesses of control can be traced. For instance with regards to freedom of speech or to individual privacy in a community or society. Or even in micro spheres, in romantic relationships.

201 O'Neill (2002).

202 Bovens (2005); O'Neill (2002a: Lecture 1, p.5).

203 Edelenbos & Eshuis (2011:23). See literature above and also: Adelberg & Batson (1978); McLaughlin & Riesman (1986); Jackall (1988:77-82) for multiple justifications of this statement.

The mutuality underlying the conception of trust is founded on the instance where, by performing the act of trusting, the trustor makes him/herself vulnerable to the trustee, since “to trust someone” implies “risk taking”, as already mentioned; furthermore, according to O’Neill, by making his/herself vulnerable, the trustor will be perceived as a trustworthy person in the eyes of the trustee, building the base for a mutual relation of trust. It is helpful to take O’Neill anecdote as practical commercial example:

“The shop where I buy my socks says I may take them back, and they don't ask any questions. They take them back and give me the money or give me the pair of socks of the colour I wanted. That's super. I trust them because they have made themselves vulnerable to me.”²⁰⁴

This is also the principle underlying assumptions related to transparency and public accountability, where organizations should by being “transparent”, become vulnerable, thus earn public trust. Also transparency is expected to contribute positively to trust by building credibility²⁰⁵. However, as O’Neill points out, that is not the scenario which we have been witnessing under increased demand for accountability²⁰⁶, at least not according to the polls. The attempt to restore public trust in institutions and organizations through increased accountability (implying transparency, vulnerability and control) has been hardly criticized by scholars. Some²⁰⁷ advocate from the point of view of the “necessary balance between trust and control”; in this case, the quest for more transparency (accountability) may be interpreted as a positive narrative of “control”.²⁰⁸ Hence based on this perspective, such strategy would never be able to restore public trust as excess of control should in fact weaken trust. Researches show that this assumption may be correct, as they indicate that never before, the level of trust in institutions and organizations in the United States, the United Kingdom and worldwide has been as low as it is today²⁰⁹, under increased demand for accountability. Others²¹⁰ warn about the danger of over-exposure²¹¹, by arguing how mandatory transparency may become counter-productive in an organization as the risk of punishment (threat) increases and individual employees, also impacting the organization’s identity as whole, become more risk averse, as Behn explains:

“If accountability is pursued too harshly, public managers may thus learn the wrong thing, they learn to avoid risk taking, to pass the buck and to shield themselves against potential mistakes and criticism”²¹²

204 O’Neill (2013:7’29”).

205 Alt & Lassen (2006).

206 O’Neill (2002: Lecture 1, pp.2-3).

207 Edelenbos & Eshuis (2011).

208 Dubnick (2014:14); “[...] accountability as a means to make government more democratically responsive and socially responsible.” - Dubnick (2014:21); “[...] accountability as a vehicle for improving the performance and efficiency of government agencies and programs.” - Ibid.

209 Stevenson & Wolfers (2011); Edelman (2015); Institute of Politics, Harvard University (2014); Slack (2013).

210 Behn (2001:11).

211 Heald (2006).

212 Behn (2001:16).

Such behaviour would rather lead to inefficient decision-making and problem-solving²¹³, as one of risk aversion's repercussion is inhibition of creative thinking.²¹⁴ Therefore the outcome would be the opposite from the first intended outcome regarding increased transparency and accountability: improved performance. This argument refers back to the mentioned issue of hampered professional autonomy through excess of control, in this case in form of accountability, as O'Neill states that *the system of accountability that is meant to secure trustworthiness and evidence of trustworthiness is actually doing the opposite. It is distracting people who have to do difficult tasks*²¹⁵ (e.g. professionals).

For supporting the above arguments one may draw a comparison between the individual (micro) and the organizational (macro) levels, by bringing up the topic with regards to individual privacy and constant surveillance (a negative form of sporadic oversight). Why would people struggle for safeguarding their privacy? For they know that, by completely renouncing privacy, they do also renounce freedom. The same pattern may be transferred to within organizations, which are, and one should not forge, also formed by individual professionals. If deprived from freedom, human beings tend to be less creative and effective, so does an organization.

Another line of criticism claims that the end of secrecy (transparency) will not end deception.²¹⁶ This may be understood if the "vulnerability" which should be result from transparency, is held as being neither real nor helpful as it entails no real risk taking from the part of the organizations, who would not disclose compromising data. Bovens²¹⁷ provokes further considerations on the matter by inferring that:

"Transparency can be an instrument of external hierarchical control, paradoxically operating in a non-transparent manner, for example, through opportunistic intervention in forms conducive to blame deflection. It may thus allow control to be directed from 'outside' the organization, calling into serious question where organizational boundaries really lie."

It is still worthy to quote the insightful view point from Finel and Lord²¹⁸ towards transparency:

"[...] it cannot be safely assumed that better information will lead to more satisfaction or higher trust; not least, it may suddenly expose publics to the uncertainties hitherto hidden beneath professional mystiques and to the professional errors that inevitably occur in, for example, healthcare and examination systems."

In addition it is essential to highlight how modern [bureaucratic] accountability systems relate to pre-factum accountability. Bureaucratic mechanisms for regulation and control, are based in both forms of pre-factum accountability, deriving from positive and negative sentiments as explained. However some fundamental aspects related to natural law (moral), such as the mutual character

213 Adelberg & Batson (1978); McLaughlin & Riesman (1986); Jackall (1988:77-82).

214 Papadopoulos (2012:239-240).

215 O'Neill (2013: 5'55").

216 O'Neill (2002a: Lecture 4, pp. 3-4).

217 Bovens (2005:64).

218 Finel and Lord (1999: 319–22).

of trust involving vulnerability, have been compromised in the bureaucratic configuration in pro of risk reduction.

For instance, in an organization, Jim is no longer the trustor as he delegates a task to Tom. That is because, independently of Tom being a trustworthy person, he is bounded by written contracts where he is obligated to perform and act accountably in relation to Jim, facing the risk of being punished if otherwise. Thus Jim (the accountant) “makes” Tom accountable and Tom (accountee) will then account to Jim. There is a shift in the concept. Here there is no risk taking from the part of the “accountor” (who is no longer a trustor), thus he/she will not by the act of holding somebody else accountable, make him/herself trustworthy in the eyes of the accountee. In such a scenario, Jim does not trust his colleague Tom because he is a trustworthy individual, but because he is accountable. Hence trust loses its place in what was supposed to be a twofold and two-way relationship.

Furthermore, the instance of threat and punishment, previously related to the “negative of accountability” (trespasser example) only, has pervaded the sphere of trust, attributing negative sentiments to relationships of collaboration and cooperation, as it will be clarified.

For the purpose of reflexion, I would like to mention Dubnick’s conjecture proposing a historical link based on speech act theories, where [modern] accountability would find its roots in the act of “oath taking”, which has implied strong threat²¹⁹ if dishonoured. Negative sentiments such as threat, blame and punishment are easily discerned in current organizational contexts, where “hierarchical accountability” (as part of a control mechanism of bureaucratic organizations) is concerned. By taking advantage from semantic configurations for enhancing perception, one may consider trust and accountability as qualifiers of a subject, being represented by the compositions “to be accountable” and “to be trustworthy”. The former carries nowadays (particularly within organizations) a rather negative connotation in comparison with the latter, which is in turn, universally perceived as a virtue. As accountability, or being held accountable is broadly perceived as synonym of punishment as Behn states:

“They recognize that if someone is holding them accountable, two things can happen: When they do something good, nothing happens. But when they screw up, all hell can break loose. Those whom we want to hold accountable have a clear understanding of what accountability means: Accountability **means punishment**.”²²⁰

Nevertheless [modern] accountability is not only perceived as a negative element. Paradoxically it is also widely perceived as something positive whereas with regards to trust, general sentiments function exactly the other way around (one of the negative aspects of the bureaucratization of trust and pre-factum accountability). For illustrating such perceptions, one may consider the illocutionary acts of “holding somebody accountable” and of “trusting someone” from a risk management perspective. The former entails “risk transfer”, whereas the latter entails “risk taking” (as by trusting

219 Dubnick (2014:28).

220 Behn (2001:3).

someone, on becomes vulnerable to another, whose behaviour is not under one's control, as explained). This inference is crucial for the overall understanding and contextualization of the present "trust-accountability or trust-control"²²¹ discussion. For it becomes clear that in a system where risk avoidance is the maxim and generally preferred due to its bound to "safety and maintenance of the *status quo*", holding someone accountable is perceived as safe (positive), whereas trusting someone is perceived as risky (negative). Thus a natural outcome within bureaucratic systems would be the weakening of trust, related to positive accountability, as it acquires a negative connotation through ponderation regarding "avoidance of potential threats".

As shortly mentioned, throughout the last paragraphs one has witnessed an apparent paradox in the interplay between trust and [modern] accountability within organizations: it is perceived as positive and "safe" to hold someone accountable (getting rid of risk), but it is negatively perceived to be held accountable (punishment); moreover it is negative to trust someone as it is risky (potential to undermine safety), but it is positive to be deemed as trustworthy. Withal in closer look, it may not be a paradox after all, as the logic of vertical hierarchies and the bureaucratic propensity for establishing oligarchies is taken into account. This discussion is however out of the scope of this work.

Finally I would like to reinforce what has already been stated in the beginning of the present section (3.3): theories developed to explain [modern] accountability (trust and control bureaucratized) within organizations, between different organizations and between organizations and the general public, have immensely contributed to the understanding of the whole of the complex dynamic behind the phenomenon in focus throughout this thesis: the reluctance from the part of organizations to embrace crowdsourcing and citizen science as valid data sources; and are to be regarded as part of the argumentation supporting the development of the final hypotheses.

3.4 Foucault on Knowledge and Power

"Power must be analysed as something which circulates, or rather as something which only functions in the form of a chain. It is never localised here or there, never in anybody's hands, never appropriated as a commodity or piece of wealth. Power is employed and exercised through a net-like organization. And not only do individuals circulate between its threads; they are always in the position of simultaneously undergoing and exercising this power. They are not only its inert or consenting target; they are always also the elements of its articulation. In other words, individuals are the vehicles of power, not its points of application."²²²

In this section, I would like to very concisely explain foucaultian theories concerning power, knowledge and hierarchical structures. This will be relevant for this thesis as it questions otherwise "non-questionable" forms of knowledge (and truth) production, retention and communication

²²¹ Terminology varies in the literature.

²²² Foucault (1980:98).

on the basis of bureaucratic authoritative bodies (institutions and organizations), that is, relating to all theories and theoretical frameworks discussed until now.

Semiotics and Searle's ontological reality throw some light on how social reality is created through discourse and continuous societal agreements. Foucault argues that such discourses and agreements are performed within specific contexts where power flows vertically through hierarchies and control mechanisms (in organizations and institutions) and where knowledge and truth are produced, leaving peripheral discourses and sources of knowledge (subjugated knowledges) excluded from the stage²²³ where societal agreements take place. For defining the concept, there is no better than to quote:

“[...] I believe that by **subjugated knowledges** one should understand something else, something which in a sense is altogether different, namely, a whole set of knowledges that have been disqualified as inadequate to their task or insufficiently elaborated: naive knowledges, **located low down on the hierarchy, beneath the required level of cognition or scientificity**. I also believe that it is through the re-emergence of these low-ranking knowledges, these unqualified, even directly disqualified knowledges (such as that of the psychiatric patient, of the ill person, of the nurse, of the doctor-parallel and marginal as they are to the knowledge of medicine- that of the delinquent etc.), and **which involve what I would call a popular knowledge (le savoir des gens)** though it is far from being a general common sense knowledge, but is on the contrary a particular, local, regional knowledge, a differential knowledge incapable of unanimity and which owes its force only to the harshness with which it is opposed by everything surrounding it [...]”²²⁴

Foucault's work on subjugated knowledges focuses on a method of research for the discipline of history, which he has named “genealogies”, and defined as *the combined product of an erudite knowledge and a popular knowledge*.²²⁵ Once more, for a full grasp of the concept (of genealogy), I chose to quote Foucault's own words:

“By comparison, then, and in contrast to the various projects which aim to inscribe knowledges in the hierarchical order of power associated with science, (qualitocracy²²⁶), a genealogy should be seen as a kind of attempt to emancipate historical knowledges from that subjection, to render them, that is, capable of opposition and of struggle against the coercion of a theoretical, unitary, formal and scientific discourse. It is based on a reactivation of local knowledges- of minor knowledges, as Deleuze might call them- in opposition to the scientific

223 Well defined bureaucratic structures, such as academia, delimitate such a stage where “the exercise of power itself creates and causes to emerge new objects of knowledge and accumulates new bodies of information.” – Foucault (1980:51).

224 Foucault (1980:82; my emphasis).

225 Ibid. p.83.

226 My annotation.

hierarchisation of knowledges and the effects intrinsic to their power: this, then, is the project of these disordered and fragmentary genealogies.”²²⁷

Notwithstanding the same rationale may be also applied to various fields of knowledge, from environmental to medical sciences. Foucault advocates that such subjugated knowledges should be brought back to this stage where societal agreements (policy and decision making) take place, and taken into consideration as a form of criticism to institutionalised knowledge; for this would be the only way for defying authoritative power as he states: *[...] it is through the re-appearance of this knowledge, of these local popular knowledges, these disqualified knowledges, that criticism performs its work.*²²⁸ I argue in this thesis that crowdsourcing and citizen science are key approaches for gathering and exploring this kind of knowledge and hold great potential for problem solving when combined to, and confronted with other “erudite” sources of knowledge (information).

Finally bureaucratic theory (born in a capitalist context) outlines almost all issues to be discussed in this part of the theoretical framework. These are on a general level: accountability and trust, control, oversight, freedom, individuality (threatened and enhanced concurrently, hampering creativity and collaboration), autonomy, dehumanization, excess of rationalization, domination through knowledge management (production and retention of knowledge), power concentration and polarization of social classes (oligarchy).

3.5 Complexity and Uncertainty

“Doubt is not a pleasant condition, but certainty is absurd.”²²⁹

Following the line of argumentation of other theoretical frameworks presented up to this point, it is possible to assert that institutionalization and bureaucratization of otherwise natural procedures have aimed to reduce uncertainty and risk of human life; and according to Foucault, they have also contributed to encapsulate knowledge production, there, where power flows and is concentrated. Science as an institution, has too, relied on sets of rules and protocols, on manuals and quality assurance procedures to ensure the production of “the truth”. Nevertheless we have been living in a world of ever increasing complexity as the number of variables, structures and connections keep multiplying and changing. Hence, if before, the possibility of certainty was already doubted by philosophers such as Voltaire and later Wittgenstein²³⁰, today, certainty, is argued²³¹ to be something unattainable; also in science.

This realization, informed chiefly by the work of Jerome Ravetz and Silvio Functowicz²³² on uncertainty in science, was a turning point on the course of the present thesis, as it has pointed new directions (all theories and frameworks present in this section) to look for more insightful

²²⁷ Foucault (1980:85).

²²⁸ Foucault (1980:82).

²²⁹ Voltaire, in a letter to Frederick the Great, 16 April 1767.

²³⁰ Stroll (1994).

²³¹ Prigogine (1997) and by others.

²³² Functowicz & Ravetz (1990; 1992; 1993).

explanations of the phenomenon in question, once the factual discourse concerning data/information quality and issues of standardization and typologies was overshadowing other crucial issues underlying organizations' prejudice towards [non-profit] crowdsourcing and citizen science as data/information sources as those with which the previous sections are concerned.

3.5.1 Data Quality in Uncertain Scenarios

“Policies for sustainability cannot wait until all the facts are known.”²³³

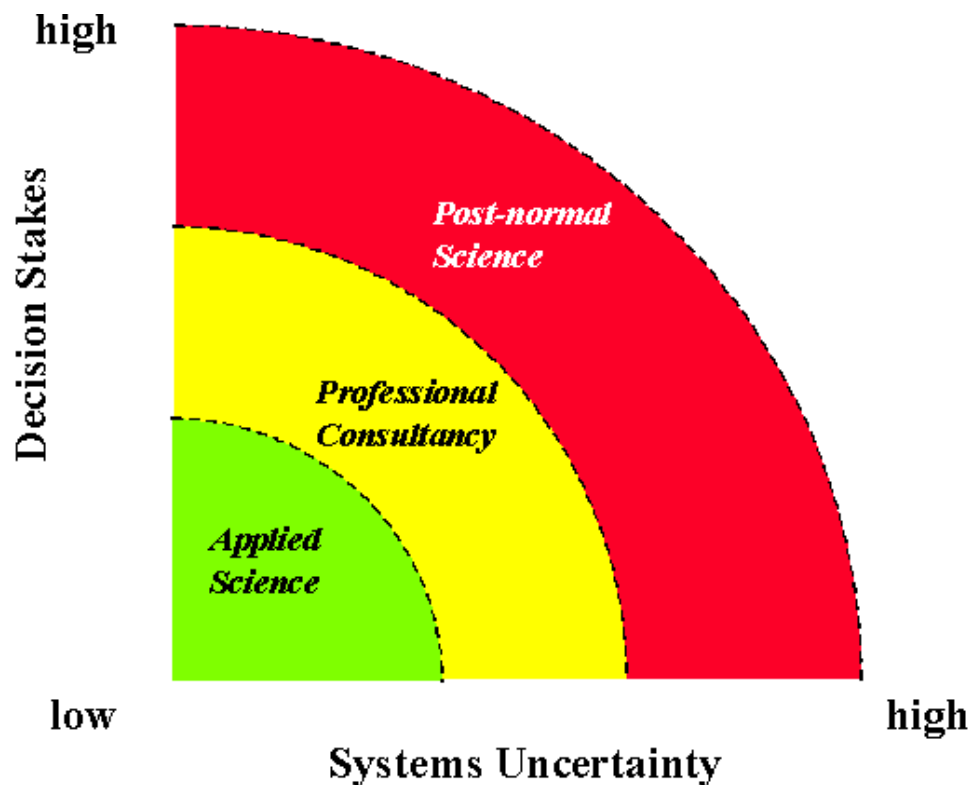
Ravetz and Functowicz recognize the context of deep uncertainties in which science is inserted, and have devoted their research career for developing a model for communicating uncertainty, named NUSAP. Their method for dealing with uncertainty issues is also coherent and even analogous with O'Neill's conviction on the benefits of “informed consent”²³⁴ in contraposition to excess of accountability, as it will be clarified in chapter six. Both approaches acknowledge the essential roles of accountability and quality and offer an alternative perspective of these concepts. O'Neill talks about intelligent accountability (in opposition to box-ticking and mechanized processes) based on sincere report on successes and failures and on informed consent (not different from risk and uncertainty communication) for achieving quality in problem solving and decision making. Ravetz and Functowicz highlight the crucial role of data/information quality even more, when these are uncertain and propose the communication of uncertainty levels (in processes and in product) as the best way for improving data/information quality (consequently decision-making) in such contexts.

The work of Ravetz and Functowicz focuses on environmental governance and issues, nevertheless it may be applicable (even if partially) to all situations where facts are uncertain, values in dispute, stakes high, and decisions urgent. *For dealing with these variables, the traditional guiding principle of research science, the goal of achievement of truth or at least of factual knowledge, must be substantially modified.*²³⁵ The basic notions of NUSAP model regard the combination of two of these variables: “decision stakes” or “value” (y axe) and “systems uncertainty” or “uncertainty” (x axe) as it is illustrated in Figure 1 below.

²³³ Jerome Ravetz, 14-08-2002; [<http://www.nusap.net>].

²³⁴ O'Neill (2002a: Lecture 5, p.1); O'Neill (2004).

²³⁵ Functowicz & Ravetz (1990; 1992; 1993).

Figure 1: Post-normal Science Diagram²³⁶

Although science is entitled to be “value-free” *per se*, in a world where the variables above are constantly present, especially with concerns to environmental issues, it is no longer prudent to assume a value-free assessment or recommendation. Such a scenario was, based on Kuhn’s notion of scientific revolutions,²³⁷ named “post-normal science” and by characterizing a paradigm shift, it:

“[...] focuses on aspects of problem solving that tend to be neglected in traditional accounts of scientific practice: uncertainty and value loading. It provides a coherent explanation of the need for greater participation in science-policy processes, based on the new tasks of quality assurance in these problem-areas.”²³⁸

By greater participation, Ravetz and Funtowicz refer to “extended peer communities”, consisting not merely of persons with some form or another of institutional accreditation, but rather of all those with a desire to participate in the resolution of the issue.²³⁹ In addition, in the idea of post-normal science, the term “normal” may be understood as an analogy to Foucault’s notion of “society of normalization”²⁴⁰, being traditional science a part of its construction.

²³⁶ Funtowicz & Ravetz (1999).

²³⁷ Kuhn (1962).

²³⁸ Funtowicz & Ravetz (1990; 1992; 1993).

²³⁹ Ibid.

²⁴⁰ Foucault (1980:107).

A group of researchers on the field of uncertainty data quality and uncertainty in environmental governance (Jansen, van der Sluijs, Ravetz et al.²⁴¹), has been interdependently engaged on the topic since over a decade and have throughout this time produced a consistent literature chiefly addressing forms of assessment and communication of uncertain data/information. The Guidance for Uncertainty Assessment and Communication (2013)²⁴² has provided insightful methods which can be applied to data/information produced by crowdsourcing and citizen science approaches, particularly those concerning spatial data. This topic will be approached as an argumentative solution for the generally advocated problematic of data/information quality in chapter five.

3.6 Distributed Cognition

Finally, there is the theory of distributed cognition, developed by Hutchins²⁴³, which does too (combined with all previous) play an important role informing this thesis.

“Distributed cognition refers to a process in which cognitive resources are shared socially in order to extend individual cognitive resources or to accomplish something that an individual agent could not achieve alone. Human cognitive achievements are based on a process in which an agent’s cognitive processes and the objects and constraints of the world reciprocally affect each other. Cognitive processes can be distributed between humans and machines (physically distributed cognition, Norman, 1993; Perkins, 1993) or between cognitive agents (socially distributed cognition).”²⁴⁴

The notion that cognitive resources are shared both socially and between machines is not only useful for human computation studies but also for crowdsourcing approaches. In addition Hutchins and others²⁴⁵ advocate, in agreement with Bakhtin’s ideas²⁴⁶, that cognition can be enhanced, that is, be superior in performance than when consider individually, through the clash of data/information emanating from different sources; also socio-cognitive conflicts resulting from peer interaction (in alignment with post-normal science’s conception).

This theory adds another plus point to crowdsourcing and citizen science approaches that is not just based on “distributed cognition” between machines, between humans and between machines and humans, prompting the confrontation of all these, but also serve, when a final product, as an extra data/information source, to be confronted with others such as scientific experiments or professional reports, enhancing thus the overall data quality. The latter has been also called triangulation and it is a method for improving data/information quality in many domains, from

241 Petersen, A. C., Janssen P. H. M., van der Sluijs, J. P., Risbey, J. S., Ravetz, J. R., Wardekker, J. A., Hughes, H. M.

242 Petersen et al. (2013).

243 Hutchins (1995; 2000).

244 Lehtinen et al. (1999:11).

245 Ibid.; Mugny & Doise (1978); Piaget (1980).

246 “As Mikhail Bakhtin (1993) observed, knowledge is intersubjectively and dialogically constituted. We do not all know the same thing, however. Knowledge is created through difference [...]” - Carolan & Bell (2003:229).

social sciences to mathematics. *Meier* argues²⁴⁷ and I do agree with him, that triangulation is actually a natural human trait, that by receiving an information, people will automatically verify its verity by reaching for another source. All together, the theory supports crowdsourcing and citizen science approaches making the argument for enhanced cognition, thus better data/information.

247 In interview.

4 Core Concepts

This chapter will introduce the core concepts of this thesis and contextualize them within the techno-socio-political context while partially informing, through a brief overview on flawed terminologies, typologies and standards regarding crowdsourcing and citizen science, one of the main perceived challenges identified through interviews' analysis: little understanding.

4.1 Crowdsourcing

“Any new media technology or concept, traced back even over centuries, transitions from early buzzword to mature, situated social phenomenon after navigating a complex public discourse of uncritical optimism and moral panic (Pingree & Gitelman 2003; Flichy 2007/2001). Crowdsourcing is no different.”²⁴⁸

The term “crowdsourcing” was first coined in 2006 by Jeff Howe (and the chief editor of Wired at that time) in the article “The Rise of Crowdsourcing”²⁴⁹ along with a plain explanation. Nonetheless since then, the term has had its connotation expanded and reshaped although after careful analysis it is possible to state that its literal meaning remains. Due to twists and turns in connotation, as other relatively new terms widely used in the network age (e.g. the metaphor “cloud”, and the prefix “cyber”), “crowdsourcing” became an imprecise, too broad and/or abstract term, **hampering straightforward dialogues on the topic**. In 2015 the definition of crowdsourcing in Howe’s website is the following:

“Crowdsourcing is the act of taking a job traditionally performed by a designated agent (usually an employee) and outsourcing it to an undefined, generally large group of people in the form of an open call.”

Nowadays the constellation of projects and activities encompassed by the term crowdsourcing is extensive and complex, often not fitting in the definition above as it will be clarified in this chapter. Furthermore it is paramount to highlight the forms of crowdsourcing of concern to this thesis as well as the reason why these were chosen over others. Therefore I will invest this section in an attempt to present a clear landscape of meanings and practices in which this currently imprecise term is inserted.

The method of crowdsourcing *per se*, if understood (beyond Jeff Howe’s definition) as a conception of relying on a/the²⁵⁰ crowd for solving a problem or providing the necessary data/information/fund for doing so, may be arguably as old as public consultation.

The term nowadays, in contrast to older practices, implies in a vast majority of the cases, the reliance on internet (including improved online platforms and applications) and frequently other [new] technologies (e.g. smartphones, sensors), not just for the exchange of data/information,

248 Brabham (2012:394-395).

249 [<http://www.wired.com/wired/archive/14.06/crowds.html>].

250 To be differentiated in the following paragraphs.

but also for providing suitable mediums in the cyberspace for analysing (mostly categorizing) data and for fostering collaboration between spatially isolated individuals through discussion and the exchange of ideas.

As one can see, as a general rule applied to almost every field, the practice has been invigorated in the last decade by evolving technologies, which in this case have enabled the collection, analysis and visualization (not necessarily in this order) of a never before graspable amount of data, becoming a powerful tool for problem solving through distributed cognition, human computation, collective awareness and intelligence inside or outside of the scientific realm.

By researching on crowdsourcing as a method, one will come across older practices involving the same elements (open call and generally large number of people) mentioned above, such as traditional scientific experiments (including social sciences' questionnaires) and public consultation (e.g. polls) and it will be noticed that they are still rarely named "crowdsourcing" although some of them are already making use of internet to reach a larger number of inputs for their research.

One example of an old fashioned practice entering the world of crowdsourcing is the mobile app "The Great Brain Experiment"²⁵¹ developed by the Wellcome Trust Centre for Neuroimaging at UCL²⁵², where a number of cognitive tests presented in form of simple games collect users' performance data through internet, generating a much larger dataset than it would be possible to achieve by inviting people to submit to the tests in a laboratory. The larger the data set, if it may be properly analysed, the higher the reliability of the results.

As for public consultation, it seems like constitution can be crowdsourced as we have witnessed an attempt of doing so in Iceland (2011)²⁵³, albeit democracy itself is not seen as a crowdsourcing project, probably because it lacks the component "internet". Nevertheless it is foreseen that this component will be at some point, when considered secure enough, integrated in the voting system of official elections. The practice has already been labelled "cyber voting" or "e-voting". Will in this case democracy be considered a crowdsourcing project?

In an attempt to differentiate the current phenomenon from older practices, which do also fit the classic definition of crowdsourcing, Meier²⁵⁴ has introduced the neologism "cyber crowdsourcing"²⁵⁵ (in the same blog post he has referred to "digital crowdsourcing" as well). By drawing an analogy with the term "cyberscience", defined by Nentwich as:

"[...] all scholarly and scientific research activities in the virtual space generated by the networked computers and by advanced information and communication technologies, in general."²⁵⁶

"Cyber crowdsourcing' may, in turn, be understood as 'crowdsourcing activities' (as previously defined) taking place in the virtual space generated by the

251 [<https://play.google.com/store/apps/details?id=uk.ac.ucl.greatbrainexperiment&hl=de>].

252 University College London.

253 [<http://www.theguardian.com/world/2011/jun/09/iceland-crowdsourcing-constitution-facebook>].

254 Patrick Meier is an internationally recognized thought leader on humanitarian technology and innovation and one of the main interviewees supporting the development of the present work.

255 In his blog: [<http://irevolution.net/2014/10/21/code-of-conduct-cyber-crowdsourcing-for-good>].

256 Nentwich (2003:22).

networked computers and by advanced information and communication technologies, in general.”²⁵⁷

The compound is nevertheless not likely to be adopted. The same effort for coining a more specific term, in an attempt to differentiate a current phenomenon from what is seen as “not new”, can be identified within the citizen science²⁵⁸ community, where specific groups²⁵⁹ have been using the term “citizen cyberscience”, with which the rest of the “citizen science community” does not seem to sympathize as we can witness in almost all the official documents such as the “White Paper on Citizen Science for Europe”²⁶⁰ and those released by the two recently founded citizen science associations²⁶¹, which disregard the neologism.

Although the new compound (including the prefix cyber-) may be literally, most clearly defined and exact, I have chosen in the length of this work, to refer to the broader and most widespread terms “crowdsourcing” and “citizen science” as despite of acknowledging the contrast between “the old way” and “the new way” (cyber), I understand that the latter already prevails not just in practice but also in connotation, making the introduction of an extra morpheme redundant. That is because by the time the terms were coined, the “cyber context” was already if not a given, widely spread, extrapolating the compounds’ literal meanings. So in conversations about “crowdsourcing” or “citizen science”, the implication of *the virtual space generated by the networked computers and by advanced information and communication technologies, in general*²⁶² in the process, will show to be self-evident.

There is a variety of types and architectures of crowdsourcing (competition/challenge, microtasking, geo-tagging, distributed computing, funding, rating systems, etc.) which will be determined according to what will be crowdsourced (e.g. ideas, data, information, opinion, money, cognition, processing power...), who has initiated the project (user, company, etc.), who or what will be the source (which kind of crowd: machines, hybrid, bounded crowd...) and which is the purpose of the project (gather, analyse or filter big data and geospatial data, raise funds, mobilizing collective intelligence for fostering creativity, innovation and effectiveness, etc.).

257 Ibid.

258 “Citizen Science” is as crowdsourcing, considered a rather old practice, referring back to the amateur scientists, who have been working prior to the “professionalization of science” that took place in the 20th century. In this sense, we talk about highly motivated individuals or small groups of passionate explorers who have been practicing science independently even before the term “science” has been widely established. Concerning the engagement of a larger number of people in a scientific project, we may also refer to a very few cases dating back to the 19th century, which were mostly carried out manually through a high number of letter exchanges.

259 Such as the “Citizen Cyberscience Centre” (University of Geneva, CERN and UNITAR/UNOSAT) and the consortium of the EU FP7 project “Citizen Cyberlab” (the former three plus University College London, University of Paris Descartes, Imperial College London, The Mobile Collective) who have organized an important summit on the field in February 2014: the “Citizen Cyberscience Summit”. See: [<http://citizencyberlab.eu/partners/citizen-cyberscience-center>] and [<http://cybersciencesummit.org/2014speakers>].

260 [<http://ec.europa.eu/digital-agenda/en/news/project-socintize-announces-white-paper-citizen-science-their-final-conference>].

261 [<http://citizenscienceassociation.org>]; [<http://ecsa.biodiv.naturkundemuseum-berlin.de>].

262 Nentwich (2003:22).

All these traces settle the complex multi-facet crowdsourcing landscape, which will eventually show to be highly discrepant, especially concerning the ideological frameworks in which they are embedded, as we will see.

Yet there are three elements common to most of them, from which the first two are in agreement with Howe's definition: (1) the participation/contribution of a rather large number of people (or their respective computers) with a project, characterizing "a" or "the" crowd, at least in one sense of the term²⁶³; (2) an open call; and (3) the reliance on the internet/cyberspace as the central mean for data and information gathering/analysis/exchange as well as the medium of the "open call".

Notwithstanding as it will be analysed in the following section, there is an important crowdsourcing type, named "bounded crowdsourcing"²⁶⁴ or "nichesourcing"²⁶⁵ which operates as an exception to the rule of "open call" (as considered by many an inherent characteristic of crowdsourcing) and to other two elements, broadly perceived as central parts of crowdsourcing, such as amateurism and anonymity.

The involvement of amateurs and/or volunteers (as in the understanding of *the crowd* corresponding to "general public", "common people", "the masses"), is upheld by many as a given element of crowdsourcing as it is implied in Howe's definition. Be as it may, Brabham (2012) argues that this is not the case in many scenarios, included those characterized as "unbounded crowdsourcing", as we will learn further in this chapter.

Thereupon anonymity is another element frequently considered inherent to crowdsourcing as once more, implied in Howe's definition by the word "undefined", and openly advocated by other prominent "crowdsourcing experts" such as Surowiecki, author of the book "The Wisdom of Crowds", who states:

"[...] a crowd can be defined as a large set of anonymous individuals. Implicit in this definition is the idea that a firm cannot build its own crowd. The strength of the crowd is the possibility to choose from the contribution of many contributors with different backgrounds, qualifications and talents."²⁶⁶

Withal not just the notion of "bounded crowdsourcing/nichesourcing" refutes the generalization of both amateurism and anonymity in crowdsourcing projects, but other examples of [unbounded] crowdsourcing projects involving personal/professional profiles may be traced.²⁶⁷

263 The most generally understood meaning of crowd is "many people". "A" crowd is commonly understood as a definable number of people gathered together or in interpersonal isolation although with common purposes or set of emotions. In turn, "the" crowd is most commonly understood as "the masses" as it will be explained in upcoming paragraphs.

264 Meier (2009).

265 De Boer et al. (2012).

266 *In*: Bauwens, Mendoza & Iacomella (2012:102).

267 Many crowdsourcing platforms, such as "Zooniverse" (<https://www.zooniverse.org>), require registration before allowing users to start to contribute. Even if some of them require solely an E-mail address, which is nowadays sufficient for tracing back the identity of the user. As a further example, one may cite "citizen journalism" as it is considered a form of crowdsourcing and often not based on anonymity.

4.1.1 Bounded and Unbounded Crowdsourcing

In the previous section, two distinctions concerning the term “crowd” were briefly outlined; the differentiation between “*a crowd*” and “*the crowd*” as well as between “bounded crowd” and “unbounded crowd”. This section will be dedicated to the elucidation of these terms and their implications to the crowdsourcing landscape. Firstly let us resort to the dictionaries. According to the Collins Dictionary “crowd” is:

“A large number of things or people gathered or considered together.”²⁶⁸

The Oxford Dictionary provides beyond the definition above other two relevant rationales:

“A group of people who are linked by a common interest or activity.”²⁶⁹

“The crowd: the mass or multitude of ordinary people.”²⁷⁰

The most generally understood meaning of the term crowd is simply “many people”. Considering the definitions above and the popular understanding of the term, which often differs from the technical definition, one can conclude that *a crowd* is commonly understood as a definable (though rather large) number of people gathered together or in interpersonal isolation (considered together) with common purposes, interests, activities or set of emotions. Whereas *the crowd* has a more universal connotation, being most frequently presumed as “the masses”, “general public”, “common people”, as noted in page 49.

This discernment may infer an apparent coherency with the notion of bounded and unbounded crowds, two types of crowdsourcing approaches defined as:

“The term ‘crowd’ can mean a large group of people (unbounded crowdsourcing) or perhaps a specific group (bounded crowdsourcing, also called expert-sourcing). Unbounded crowdsourcing implies that the identity of individuals reporting the information is unknown whereas bounded crowdsourcing would describe a known group of individuals supplying information.”²⁷¹

“[...] nichesourcing, a specific form of human-based computation that harnesses the computational efforts from niche groups rather than the ‘faceless crowd’. We claim that nichesourcing combine the strengths of the crowd with those of professionals, optimizing the result of human-based computation for certain tasks.”²⁷²

In a first glance one may associate *a crowd* as being analogous to a “bounded crowd” and *the crowd* to “unbounded crowd”. Withal when carefully considered the apparent parity is partially flawed.

268 [<http://www.collinsdictionary.com/dictionary/english/crowd?showCookiePolicy=true>].

269 [<http://www.oxforddictionaries.com/definition/english/crowd>].

270 Ibid.

271 Meier (2009).

272 De Boer et al. (2012).

Meier, De Boer et al. distinguish the two forms of crowdsourcing based on the anonymity of the contributors as well as on selectivity regarding the latter. Nevertheless the establishment of such polarities shows to be problematic within the discourse due to blurry lines and frequent intersections between crowdsourcing elements and processes.

Not all unbounded crowds are invariably anonymous, as explained in page 49 (although it may be considered as a central element to many forms of crowdsourcing), and selectivity regarding competences of contributors apply to a vast amount of crowdsourcing projects which are consistently deemed as “unbounded crowdsourcing” (by virtue of open call), particularly those in form of competition within the “Open Innovation” framework²⁷³, in which the difficulty level of the problem to be solved is generally very high, automatically filtering contributors by separating those with in-depth knowledge of the field from amateurs and hobbyists. In addition, within the described scenario, experts usually become “known” after submitting their proposals. Such selectivity can hardly be considered unintentional, therefore weakening the argument that this kind of projects targets *the crowd* instead of a selected group of people.

Perhaps Meier was unfortunate in his statement, as he should have explicitly mentioned the underlying relationship between “bounded crowdsourcing” and the necessary constitution of a pool of people (selected group) to be held on “stand by” until it is mobilized for specific problem solving.²⁷⁴ In this case a selection process to form *a crowd* suited for the accomplishment of a given goal is needed.

Even though it would still be an inaccurate definition, once a pool of people shall very well encompass a pool of volunteers, moved by cause, not exclusive to experts, thus not invariably characterizing expertsourcing or nichesourcing. The only relevant point in Meier’s statement is thus, the non-anonymous character prior to the selection procedure, considering that in “bounded crowdsourcing”, volunteers (experts or amateurs) are invited to “apply”, in opposition to “unbounded crowdsourcing” within the open innovation framework.

In such, by referring to the mobilization of a pool of experts, “expertsourcing” or “nichesourcing” seem to be reasonable labels. But how to refer to the mobilization of a pool of known (already selected) volunteers? Can it be considered crowdsourcing after all? If one considers Meier’s definition of crowdsourcing below, yes, and the next paragraphs will explain why.

“The term crowdsourcing, coined by journalist and author Jeff Howe in 2006, has helped us to frame the concept of using crowds to get work done. Implicit in the idea of crowdsourcing is the ability to create value that transcends individual contributions, crystallizing collective insights through structured aggregation. For example competitions, prediction markets, idea filtering, and content rating are all mechanisms by which collective contributions can create better outcomes than individuals or small groups.”²⁷⁵

²⁷³ To be explained further in this chapter.

²⁷⁴ This character is made explicit in one of Meier’s project called “Micromappers”, where he refers to a stand by task force. See: [<https://micromappers.wordpress.com/>].

²⁷⁵ Meier (2009); my emphasis.

After bounded, composed solely by those who have fulfilled the requirements for performing the foreseen task(s), the mobilization of that crowd no longer characterizes an open call. It was an open call in a first moment, when the pool was formed; but so is the case of a vast number of “job openings”, reaching in a first instance the general public; analogy that puts the idea of the open call element as integral to crowdsourcing in check, although it is, as already mentioned, present in most of the cases including the preceding phase of bounded crowdsourcing.

As for when the boundary of *the crowd* is delineated through the depth of the subject in question, rather than through a traditional selection process (mainly within open innovation frameworks), there is no “bounded crowdsourcing” taking place. That is because apart from the filtering, the fact that a pool of contributors will not be formed, and an open call will keep taking place for each new challenge/project that is launched, the process will keep resorting to *the crowd* in a first place, even if it is for *a crowd* to be selectively shaped as already discussed.

With regards to “a” or “the” crowd, it seems reasonable to state that an open call implies *the crowd* even when the task requires specialization (formal or informal), what will filter *the crowd* leading to the engagement of *a crowd*. The latter will happen even within a scenario of volunteers of a humanitarian project, where although tasks may not require specific skills to be performed, *a crowd* will be formed through natural selectivity of a large number of people with same purpose, set of emotion or interests, such as “helping people”.

Thus, altogether, crowdsourcing, as defined by, among others, an open call, implies forevermore a call to *the crowd* which shall inexorably result in the engagement of *a crowd* be it through coordinated-supervised (bounded) or spontaneous-logical filtering (unbounded) of skills, interests, activities or set of emotions. Hence bounded crowdsourcing may be fairly considered crowdsourcing as by virtue of ultimately sourcing *a crowd*. This is where crowdsourcing differs from other forms of sourcing: with grounds on the “crowd character” of the final labour force to be engaged, as a differentiation to job openings relying too on open calls.

Back to the question of analogous pairs; “unbounded crowdsourcing” is intrinsically related to *the crowd* through the element “open call”. Whereas “bounded crowdsourcing”, by lacking the element open call, excludes *the crowd* while implying *a crowd*. Nevertheless considering that the engagement of *a crowd* will also, in most of the cases, be the natural outcome of an open call to *the crowd*, it is not possible to link *a crowd* solely to “bounded crowdsourcing” once it is latent in unbounded crowdsourcing processes alike.

Within the crowdsourcing landscape and the **context of this thesis, which focuses on unbounded crowds**, the clear understanding of the discussed terms is important for further discussion considering the main challenges of crowdsourcing and citizen science and possible solutions, approached in chapter five.

4.1.2 Forms of Crowdsourcing

There are two main reasons why institutions, organizations and companies have been *outsourcing* over the years: (1) lack of internal capability and ponderations of costs – when no one inside is qualified for a task and it becomes cheaper to resort to external experts under temporary contracts than to hire a professional; (2) risk transfer. In the case of crowdsourcing the former does partially apply as crowds are mostly resorted to solve a problem a professional, a group of professionals or the machines were unable to solve, however on the contrary than generally believed, quality

crowdsourcing projects (especially concerning the fields of humanitarian aid and environmental protection) may not come out to be a “cheap” solution, as it will be discussed in chapter six, at least not yet. The latter in turn, does not apply to crowdsourcing as a “crowd” (when unbounded), which by not being accountable, does not overtake any risk from the project developer, what ends up being a powerful negative of crowdsourcing approaches as perceived by institutions, organizations and companies as it will be explained in this work. In addition, crowdsourcing does not solely refer to *resorting* to external actors (as in outsourcing) but also to *involving* external actors in processes, as some examples will show.

Challenge: maximize profits

“Crowdsourcing is discussed in the popular press as a process driven by amateurs and hobbyists, yet empirical research on crowdsourcing indicates that crowds are largely self-selected professionals and experts who opt-in to crowdsourcing arrangements; and the myth of the amateur in crowdsourcing ventures works to label crowds as mere hobbyists who see crowdsourcing ventures as opportunities for creative expression, as entertainment, or as opportunities to pass the time when bored. This amateur/hobbyist label then undermines the fact that large amounts of real work and expert knowledge are exerted by crowds for relatively little reward and to serve the profit motives of companies. The myth of amateur crowds thus has critical implications for labour rights in the digital age.”²⁷⁶

The terms “sourcing” as well as “outsourcing” are integral part of business’ glossaries. The former is defined as the process of finding suppliers of goods or services²⁷⁷; the latter is loaded with more elaborated definitions implying contractual activities and costs reduction for the company²⁷⁸.

Preceded by the word “crowd”, the term “crowdsourcing” means in the “business as usual context” nothing further than finding suppliers of goods or services among the crowd, in this case, a rather large number of people, through an “open call”. In an open call there are no restraints with regards to participants, although some tasks, by being extremely embedded in one specific field of knowledge, become suitable for specialists only, automatically excluding the masses as it is the case of most of the challenges presented by the InnoCentive platform²⁷⁹, which we will approach later.

As one may see, crowdsourcing seems to be a term coined for the business world and it has indeed been widely explored within this context, albeit not free from harsh criticism, especially by the fields of product and graphic design and photography (from now on referred to as “creativity branches”), that regard this practice as a form of exploitation, once companies have been outsourcing services mostly without offering back proper compensation for the performed work, especially when the project takes the form of competition, commonly presented as “challenges”,

²⁷⁶ Brabham (2012).

²⁷⁷ [<http://www.businessdictionary.com/definition/sourcing.html#ixzz3Gt0c3D18>].

²⁷⁸ [<http://www.businessdictionary.com/definition/outsourcing.html#ixzz3Gt0n6Qql>].

²⁷⁹ [<https://www.innocentive.com/ar/challenge/browse>].

the latter corresponding to many of the crowdsourcing actions carried nowadays by companies. Some examples of crowdsourcing challenges are the platforms LEGO CUUSOO (LEGO toys) and Threadless²⁸⁰ (T-shirts).

This crowdsourcing format, of competition/challenge within the creativity branches, basically due to the “open call” element, is commonly marketed as a way for fostering innovation and/or creativity, also naming the phenomena “open innovation”, however it is questionable whether or not the phenomena applies to this branch (of open innovation), once it could require a consensus of “art = innovation”, making the labelling likely to be a marketing strategy.

In this format the company attains great amounts of valuable creative inputs without any contractual commitment to the contributors, whereas many professionals (and amateurs, representing a minority among contributors in companies’ driven crowdsourcing)²⁸¹ submit, without any promise of financial compensation, their work proposal to the company hoping to be “the winner”, to whom “payment for his or her work will be awarded”. In LEGO CUUSOO there is a video explaining what the crowdsourcing action is about and they go as far as explicitly saying:

“[...] and **even** receive a percentage of the product’s sales [...]”²⁸²

As one may presume, critics are well placed in this context since companies are no longer hiring a professional for the job, who would come up with a number of proposals between which the company would have to pick up one. If the company would judge it not good enough, it would have to pay someone else to work on an alternative proposal and this second professional would also get paid at least a percentage of the whole only for the proposal and the rest of the amount would be granted if the project would be finally chosen. Now companies have endless inputs and pay just once for the final version while hours of work have been unpaid, maximizing the profit of the company and shrinking the market for professional designers and photographers.

A counter argument in favour of the crowdsourcing approach in the field in question is that the crowdsourcing competitions, once open call, provide the chance to amateurs and young, unknown professionals to sell their work to big companies, who would otherwise hire well known professionals with impressive portfolios.

Challenge: catalyse innovation and maximize profit

The most prominent example of crowdsourcing in form of open call challenge (also a form of competition) is the platform InnoCentive, that hosts challenges from different branches (from automotive and pharma industries to NASA) offering attractive monetary prizes to the winners.

The case of InnoCentive (and others²⁸³) differs from other forms of crowdsourcing within creativity branches, in that business goals largely intersect with science (mostly applied) as the

280 [<https://www.threadless.com/make/submit>].

281 According to Brabham (2012), and on the contrary from what has been publicized in the context of business and defined by Jeff Howe, who has coined the term, amateurs represent a minority among contributors of crowdsourcing projects.

282 [<https://ideas.lego.com/howitworks>].

283 See “Kaggle”: [<https://www.kaggle.com/home>].

posed challenges are normally those puzzles which could not yet have been resolved by the “in house” team and therefore characterize cutting edge research. That is, it may be indeed distinguished as an innovation catalyser, worthy of the “open innovation” labelling (what is a questionable statement in the context of creativity branches, as previously mentioned), as it mobilizes distributed creativity and problem solving, where hundreds and even thousands of people engage in solving a problem or creating a solution for a variety of challenges, from how to tackle climate change making use of NASA’s satellites’ datasets to research on cancer and the environment.

Although the phenomena seems to represent a combination of crowdsourcing with science, in this instance, instead of “citizen [crowd] science” (or crowd science, as explained in the introductory chapter), one could argue that InnoCentive better fits the definition of “cyberscience” (see page 47 for Nentwich’s definition).

That, by considering the conception of citizen [crowd] science to be closely associated with the notions of distributed cognition²⁸⁴ through geo-tagging and microtasking (both to be explained further in this section), where a crowd will be engaged in solving a given task or problem in an interdependent manner. In opposition to the latter, tasks which are carried out driven by InnoCentive challenges, will engage people or groups of people who will work independently, producing multiple alternatives for problem solving instead of one single solution. InnoCentive, if the task is not performed by a professional (formally educated), may also encompass what Grey called “citizen cyberscience”²⁸⁵ (or simply citizen science²⁸⁶).

Furthermore, this form of crowdsourcing, where the open call aims to reach all the distributed knowledge available in order to raise the chances of a forefront accomplishment, refers to one of those cases where the requirements for being able to solve a given problem are so specific that it becomes hard to say that the primer target of the open call was an “unbounded crowd” as discussed, previously. Thus most of the challenges presented in InnoCentive platform target specialists of a given field (note that specialists are not necessarily formally educated “professionals”, the IT niche is a good example), putting the conception of professionalization in check and by that, being perceived also as a “threat” to many professionals.

Granting that the open innovation character of the above described crowdsourcing platform is widely acknowledged due to the “open call” element, it is noteworthy to stress that in “open innovation” the term “open” does not refer to any of the premises of what has been called “the open movement” (to be explained in section 4.6), which by encompassing open data, -access, -science, -knowledge, promotes collaboration and criticizes ownership, especially by companies. InnoCentive, in turn, does not operate under open premises as:

“[...] project sponsors are often private organizations that seek to gain some sort of a competitive advantage by maintaining unique access to research results and new technologies.”²⁸⁷

284 See theoretical framework.

285 Francois Grey.

286 As explained in the beginning of this chapter with regards to issues on terminologies.

287 Franzoni & Sauermaann (2014).

Financially Driven Peer Production: catalysing innovation

Another example of a successful crowdsourcing model still within the open innovation framework are the OSSs (Open Source Softwares), where there is an open call and the source is available for “anyone” (again a bounded crowd due to specificity of skills required) to collaborate with the software development process. Like InnoCentive challenges, OSSs do not invariably work under open premises. OSSs differ from open innovation platforms such as InnoCentive, by the means that it is not based on competition and on a structure where the winner(s) take(s) it all.

Moreover, it is noteworthy that in the cases pinpointed above, which involve monetary transactions, there is a strict control over the information submitted via crowdsourcing, expressing no representative risk taking from the part of the initiator of the crowdsourcing action, as the line of accountability ends on the professional who will be evaluating those submitted information.

Commons Oriented Peer Production: catalysing innovation

Be as it may, if there is no financial compensation for contributors, the logic outcome will be that there will be no contributors if the outcome of the collaborative labour is not “free/libre” or “open access”. Thus in the instance of no financial compensation in an OSS, the “open innovation crowdsourcing project” may be labelled FLOSS (Free/Libre Open Source Software)²⁸⁸, being Linux the most prominent example of this kind.

Since the final product will be freely available for all, a FLOSS is characterized as commons oriented peer production, where “common” stands for common benefit and open access, and peer production implies no profit-making along the process.

Commons Oriented Peer Production: harnessing collective intelligence

The last example (Linux) is the most classic successful example of crowdsourcing in the network age along with Wikipedia, which may not be properly called Open Innovation but it is based on an open call, on open premises (open knowledge, -data, -access) and excludes monetary transactions, being also part of commons oriented peer production framework.

In the case of successful examples of *commons oriented peer production* there is, ideally, a central regulatory mechanism aiming to improve information quality, be it through peer to peer review (mostly; volunteer-based) or/and through computer algorithms, as it is the case of Wikipedia, which relies on both.

Public Consultation: catalysing innovation and solving problems for the common good

Based in the one side, on the same architecture of Open Innovation platforms such as InnoCentive (open call to unbounded crowd), this form of crowdsourcing, public consultation, which has being increasingly adopted and accepted by organizations (including many UN agencies), as mentioned in the introduction (page **Error! Bookmark not defined.**), are non-profit based and seek for solutions to social and environmental issues in the crowd (*resorting to the crowd*). In another side,

288 Bauwens, Mendoza & Iacomella (2012).

it functions such as in a classic poll, asking for opinions on various pre-selected alternatives for problem-solving as well as for further suggestions. In the latter the aim is to promote a more democratic process of decision making by *involving the crowd*. It can also be traced in democratic procedures, as in the example of Iceland (page 47) regarding a project for crowdsourcing constitution.

Microtasking (microwork), Human-based Computation or Distributed Thinking

Another form to carry out a crowdsourcing project is through microtasking. Microtasking refers to the practice of dismantling projects into a series of small tasks that can be carried out by different contributors all over the globe, be the performers of the tasks humans or their respective computers; the latter refers to a practice generally called “distributed computing”, meaning the allocation of computer power for processing massive data sets or “distributed thinking”, when the process involve human cognition. These practices are directly related to the theory of distributed cognition, explained in the theoretical framework (3.6) and are placed in opposition to Open Innovation and collective intelligence scenarios, described in the above paragraphs, which chiefly concern what has also been called collaborative thinking or volunteered thinking.

Microtasks will also vary in the level of complexity, being some easily accomplished by anyone (e.g. categorizing pictures which require no technical knowledge) while others will be targeting a group of specialists, though both bounded and unbounded crowdsourcing.

Not all projects can be easily dismantled into microtasks though. Forasmuch as the execution of these tasks must be viable independently of the whole and for some projects, especially those involving qualitative and cross-comparative analysis, methods of problem solving demanding a holistic view and often different point of views, microtasking is not applicable.

Today there are many examples of microtasking platforms. The first and largest one is the Amazon Mechanical Turk²⁸⁹, in which microtasks are paid according to the average time a contributor spends for completing each piece. This facet of microtasking, is too, as other monetary-driven approaches based on competition, highly criticized, particularly with concerns to the potential for constraining human cognition.

Non-profit microtasking is in turn, praiseworthy, as it holds the potential, in collaboration with machines²⁹⁰, to solve many of today’s most important challenges in the fields of science and emergency response.

Crowdsourcing in Emergency: social media

During emergencies, some professionals have been resorting to the crowd for better managing the situation²⁹¹. They collect for instance, Twitter information based on a given hashtag (#) related to the event (e.g. #ebola) and make use of the latter (e.g. in form of maps) for supporting the coordination of efforts and decision making. This form of crowdsourcing is possibly the most

289 See: [<https://www.mturk.com/mturk/welcome>].

290 Distributed cognition.

291 UN-OCHA: [<http://www.unocha.org>].

well-known within fields of: humanitarian aid (disasters response; conflicts) and diseases outbreaks. Actually when discussing crowdsourcing with professionals of this field, this form of crowdsourcing is the first, if not the only popping up in their minds.²⁹² The second would be “geo-tagging” (to be discussed further in this section), also possibly combined with the first.

Crowdsourcing for emergency response, is again not to be considered a new practice, as the example of emergency numbers such as the 911²⁹³ reminds us. Those, despite of still in use today, are fairly old practices based on the same principle of data collection carried out through Twitter, however being dramatically limited in their capability of information gathering: during an emergency, such hotlines become as a matter of fact, useless, as they are always “busy”.

Data gathered from social media may be massive (big data) and just partially useful for decision makers. Therefore such data must be processed (classified and analysed) in order to produce useful information. Machines are able to complete this task just up to a certain extent, therefore another layer of crowdsourcing (based on microtasking and on a bounded crowd²⁹⁴) is advisable.

Geo-tagging

Geo-tagging is both a form of crowdsourcing and also a valuable tool for crowdsourcing and citizen [crowd] science based on Geographical Information Systems (GIS). It will, through geo-locators built in electronic devices (most commonly smart phones and computers), add to an image or a text information, the data concerning the exact location (also time) of where the latter has been uploaded or sent to the central system (crowdsourcing platform). This information will be available in form of a map for better visualization and it may be stored and presented in different subject layers, depending on the character of the information.

Geo-tagging is extremely useful not just in emergency situations, where it can be combined with social media information (also holding the potential to be geo-tagged) for producing maps, but also for environmental monitoring²⁹⁵ (including crowd-science projects²⁹⁶), and many other uses, such as for street mapping²⁹⁷.

Passive Monitoring: volunteer sensing

This form of crowdsourcing concerns data gathering through wearable or other sensors (e.g. noise or movement) built in devices such as smartphones or watches. This kind of activity is carried out chiefly by citizen [crowd] science projects, mostly in combination with geo-tagging.

Finally, I will highlight once more, that this thesis focuses on those “non-profit” forms of crowdsourcing, which rely on the crowd as a valid source for data/information gathering and analysis (informing policy and decision making), thus excluding the form of “public consultation”,

292 Most of the interviewees fit this description.

293 Meier (2010).

293 Meier (2013).

294 See: [micromappers for an example: <https://micromappers.wordpress.com>].

295 See “Global Forest Watch”: [<http://www.globalforestwatch.org>]; “Tomnod”: [<http://www.tomnod.com>]; and “Geo Wiki”: [<http://www.geo-wiki.org>].

296 See “Project Noah”: [<http://www.projectnoah.org>].

297 A prominent example is the “Open Street Map”: [<http://www.openstreetmap.org>].

which as explained does not imply any form of risk taking from the part of the crowdsourcing organization (project owner) and therefore it has enjoyed widely and ever increasing acceptance.

There are still other forms of crowdsourcing worthy of acknowledgement (distributed computing and crowdfunding), but which do not concern the scope of this work, as they do not regard crowds as data/information sources.

In addition, “rating systems” may be too, considered to be a form of crowdsourcing, however in the context of SDG it may show to be relevant only as it is potentially considered as a second layer of crowdsourcing for the purpose of validation of information based on reputation (of a given individual)²⁹⁸.

As we have seen, the conception behind crowdsourcing has a much more broadening potential than *a crowd* of people engaging through internet in microtasks and creativity competitions organized by companies seeking higher profits. Crowdsourcing has being a game-changer for science (with the resurgence of citizen science and the emergence of cyberscience, with the support of the newest technological apparatus) as well as in the work of non-profits acting in the fields of emergence response (slow and fast) and environmental monitoring, being all three closely relating and intersecting.

4.2 Crowdsourcing Overlapping: citizen science and citizen journalism

4.2.1 Citizen Science

“Citizen Science is defined as organized research where the balance between scientific, educational, societal and policy goals varies across projects. It is a growing worldwide phenomenon recently invigorated by evolving new technologies that connect people easily and effectively with the scientific community.”²⁹⁹

Although citizen science definitions are often blurry and all inclusive (as above), leaving doubts on whether specific forms of volunteer engagement may be considered citizen science or not, as it is the case of environmental monitoring carried out for the purpose of policy and decision making with no partnership with research institutions or scientists³⁰⁰, people tend more or less to agree with the three named factors defining citizen science (presented in the introduction): (1) the involvement of amateurs and/or hobbyists in scientific research; (2) the engagement of anonymous contributors; and (3) the considerably high numbers of contributors engaged; being number 2 and 3 particular characteristics of crowd science (point of intersection between crowdsourcing and citizen science³⁰¹), as explained in the introduction of this thesis.

In order to consider the issue of lack of standards (multiple terminologies and typologies) as a contributory factor (together with complexity and others) to “little understanding” as one of the reasons for scepticism (reluctance to embrace) vis-à-vis these approaches, it is relevant to

²⁹⁸ To be approaches in chapters 5 and 6.

²⁹⁹ European Citizen Science Association (ECSA): [<http://ecsa.biodiv.naturkundemuseum-berlin.de>].

³⁰⁰ Where data collected will not be invariably meet its scientific purpose.

³⁰¹ As presented in the introduction (p.4).

outline the problematic in citizen science, as with crowdsourcing, but more concisely as citizen science has been already contextualized within the typology of crowdsourcing.

Terminology

The meaning behind the term “citizen science” is itself a much older practice, referring back to the amateur scientists, who have been working prior to the “professionalization of science” that took place in the 20th century. In this sense, we talk about highly motivated individuals or small groups of passionate explorers who have been practicing science independently even before the term “science” has been widely established. Concerning the engagement of a larger number of people in a scientific project, we may also refer to a very few cases dating back to the 19th century, which were mostly carried out manually through a high number of letter exchanges.

Based on the fact that citizen science concerns collaborative research, involving amateurs, and that the professionalization of science is a rather recent phenomenon in human history, there is an interesting polemic on the relevance of the term and the biases it may evoke. This polemic extends itself until the most basic questions of: “Why citizen? Is a professional scientist not a citizen?” or “What is science?”, “What is not Science?”, leading to the adoption of different terms for referring to the same practice, such as bottom-up research, collaborative research, volunteered-data, etc.

In addition, other variations of the term have been proposed, such as “citizen cyber science”, which, as explained in the beginning of this chapter (page 48), when discussing the terminology of crowdsourcing, is unlikely to be adopted. Therefore based on the same rationale of the choice for the general term “crowdsourcing”, I have also chosen to use the most general term “citizen science”, as its current meaning encompasses “traditional citizen science”, “citizen cyberscience” and “crowd-science”, as well as other initiatives for community-based collaborative research (e.g. in the environmental field).

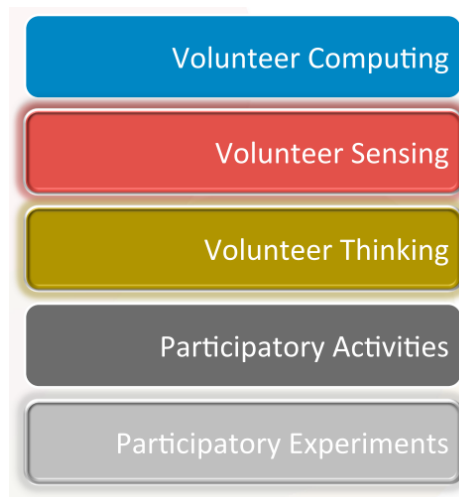
Typology

In order to illustrate the current scenario regarding the complexity of the citizen science landscape, I will provide some examples of proposed models (all currently active and present in citizen science community’s discourses) referring to the different types of citizen science projects.

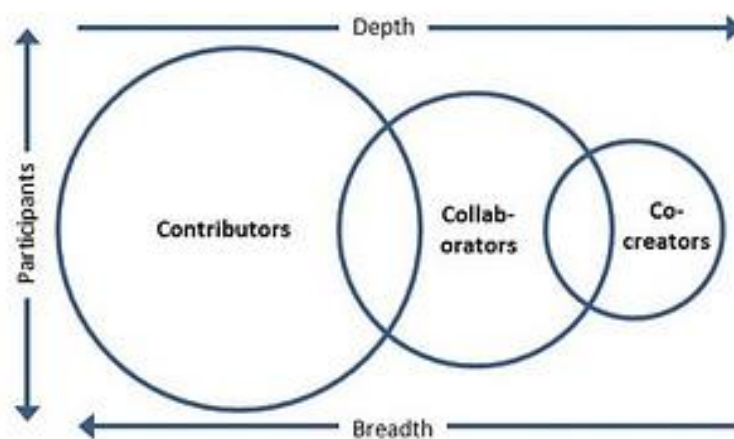
When I was first introduced to the field of citizen science, through the Citizen Cyberscience Centre (CCC). I have learned that there were three types of citizen science projects: volunteered computing, volunteered sensing and volunteered³⁰² thinking. The EU funded project “Socientize” has adopted³⁰³ the model above from CCC while adding two more types of contribution in citizen science: participatory activities and participatory experiments (see Figure 2, below).

³⁰² Sometimes the definitions appear as “volunteer” or “volunteered”.

³⁰³ Information from February 2014.

Figure 2: Types of Citizen Science Projects³⁰⁴

Ballard has presented in the Citizen Cyberscience Summit (Feb. 2014), the framework employed in the project she runs in the US. The framework was first showcased in 2012, through the article “Public Participation in Scientific Research: a Framework for Deliberate Design”.³⁰⁵

Figure 3: A Framework for Deliberate Design³⁰⁶

Haklay from University College London (UCL) has also elaborated a citizen science framework divided by levels, sometimes represented in form of a pyramid (see Figure 4, below).

³⁰⁴ Silva et al. (2014).

³⁰⁵ Ballard et al. (2012).

³⁰⁶ Ibid.

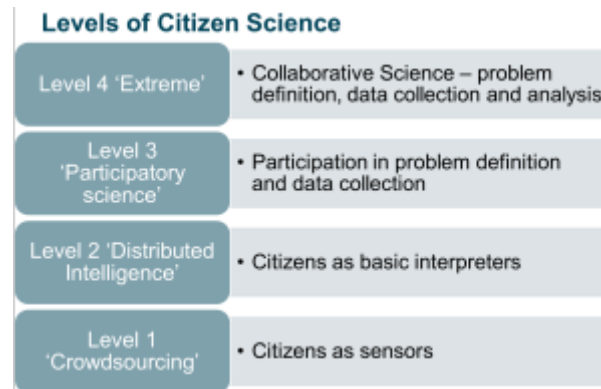


Figure 4: Types of Citizen Science Projects According to Haklay³⁰⁷

It is noteworthy that the typologies above regard the most basic classification, whereas other studies have attempted to categorize citizen science projects in a much more detailed level.³⁰⁸ Furthermore I consider Haklay's model to be the most well-informed, although I have referred to "level 2 – distributed intelligence"³⁰⁹ also as a form of crowdsourcing (as long as the task is mediated by new technologies) through microtasking. The "level 1 – citizens as sensors", refers in turn, to the forms and tools of crowdsourcing: geo-tagging and passive monitoring, presented in the last section. Moreover, I would add, below the current "level 1", "volunteer computing"³¹⁰ for scientific purposes, as the lowest level of engagement from the part of the volunteer who is expected solely to run a software in his/her computer in order to contribute.

In this sense the three levels regarding relatively low level of engagement in the project should belong to the crowdsourcing umbrella, most specifically to the middle field (overlap between crowdsourcing and citizen science) "crowd-science". Notwithstanding all the activities belonging to this "middle field" are today defined as simply "citizen science", as it was discussed in 3.1.

4.3 Citizen Journalism

Citizen journalism is not a widespread term such as crowdsourcing and still even less used than citizen science, however it regards an important part of the realm of non-profit, volunteer-based "collaborative research", where anonymous, amateurs or hobbyists report a story (usually in form of denunciation) to a crowdsourcing or citizen journalism platform, such as "Global Voices".³¹¹

Thus citizen journalism is also of concern of this thesis as it regards non-accountable (non-professional) individuals as data/information sources. This approach will show to be of extreme importance for emergency situations, especially concerning conflicts and human rights threats

³⁰⁷ Haklay (2013).

³⁰⁸ Montabone (2013); Wiggins & Crowston (2010; 2011; 2012); Franzoni & Sauermann (2014); Cooper et al. (2007).

³⁰⁹ Referred to as distributed thinking, part of the theory of distributed cognition.

³¹⁰ Societize; Citizen Cyberscience Centre.

³¹¹ [http://globalvoicesonline.org].

and also for the field of environmental protection, as illegal actions may be denounced to authorities (local, national, global) or to the media (news, social). Yet, as I have mentioned I will not refer to it throughout this thesis for the purpose of readability (information flow).

4.4 Collective Awareness Platforms for Sustainability and Social Innovation

“Collective Awareness Platforms are expected to support environmentally aware, grassroots processes and practices to share knowledge, to achieve changes in lifestyle, production and consumption patterns, and to set up more participatory democratic processes.”³¹²

CAPS (e.g. UNEP³¹³ Live and others) are relevant for this thesis due to their key role to the unfolding of a data revolution and the SDG. They do not characterize crowdsourcing platforms *per se*, but are supposed to heavily rely on crowdsourcing and citizen science (also citizen journalism), as they would combine data and information gathered or produced by *the crowd* (and/or the devices they wear or carry³¹⁴), or citizen volunteered data/information, with other data/information sources (e.g. official reports and remote sensing) for the purpose of raising awareness, prompting collective problem-solving and enhancing data/information quality³¹⁵ by complementing other data/information sets (from multiple sources).

In support of the latter, CAPS will provide the space for a variety of activities to be carried out: crowdsourcing or citizen science through geo-tagging; disclosure of official data/information in a comprehensive manner; sharing of best practices, stories and information concerning sustainability; and public participation on policy and decision making processes through discussions (forums) and polls.

UNEP Live is defined as an online platform thought to become a revolutionary instrument for strengthening knowledge and information networking and exchange, which shall provide knowledge and intelligence on what is happening on the ground on a [ideally] near to real time basis³¹⁶, enlarging the knowledge base for global environmental policy.

According to McGlade³¹⁷, UNEP Live’s platform, which has the potential to evolve (hopefully in a near future) to an UN system wide platform, aims to:

- Back and promote global efforts to build capacity in knowledge management (counting on experts and on artificial and collective intelligence - crowdsourcing);
- Engage the general public on monitoring processes as well as on policy and decision making;
- Speed assessments and responses (diminishing risks and attenuating consequences);
- Support open access research communities.

312 [<http://ec.europa.eu/digital-agenda/en/collective-awareness-platforms>].

313 United Nations Environmental Program.

314 See: “internet of things”.

315 Considering multiple perspectives (values) and the conception of extended peer communities, as advocated by Ravetz and Funtowicz (see theoretical framework).

316 With the support of crowdsourcing, remote sensing, citizen science and citizen journalism.

317 Jacqueline McGlade is currently chief scientist and ad interim director of UNEP’s division of early warning and assessment and former executive director of the European environment agency.

The platform relies on open standards, common tagging and in the future, on a UN System wider data policy. It aims to support within a single infrastructure, different sets of data/information coming from official sources, citizen volunteered data (through stories, sharing of best practices, crowdsourcing or citizen science), big data, sensor webs (this shall encounter its full realization in the future, expected to be characterized by the consolidation of the internet of things). UNEP Live will also provide a range of analytical tools for forming what Andrej Verity from UN-OCHA (United Nations Office for the Coordination of Humanitarian Affairs) uses to call “augmented products” – the result of the combination of multiple and different data sets.

McGlade mentions that the data will be immediately disposable for end-users (affected people), enabling public participation on decision making. It is important to note though, that the data/information shall be released to the general public just after analysis regarding potential threats to individual and group privacy.

To conclude this section, it is noteworthy that the IEAG recommends through their report³¹⁸, the establishment of a ‘SDGs data lab’ to support the development of a first wave of SDG indicators, developing an SDG analysis and visualisation platform using the most advanced tools and features for exploring data, and building a dashboard from diverse data sources on” the state of the world. As we can see, the latter seems to refer to the same ideas of the CAPS, which would contain the “SDGs data lab”.

4.5 Motivational Triggers of [non-profit] Crowdsourcing and Citizen Science

Considering that the focus of this thesis is crowdsourcing and citizen science as valid data/information sources in a non-profit level, it becomes relevant to discuss the motivations behind these approaches as they may potentially influence the quality of the data/information collected or analysed, as scholars argue³¹⁹.

We have learned in the theoretical framework about motivational theories, particularly within bureaucratic structures. Nevertheless the motivational triggers to be presented in this section concern exactly those motivations underlying actions in the non-profit, volunteer-based sector, that is operating (at least in theory) outside of bureaucratic structures, based on the lack of regulatory mechanisms such as hierarchical accountability. Moreover motivational triggers will vary across different forms and purposes of crowdsourcing and citizen science; this differences will be outlined.

4.5.1 Intrinsic Motivational Triggers

Intrinsic motivational triggers include, among others of less relevance: (1) altruism and humanity (feelings of compassion and empathy), (2) fear (e.g. environmental risks), (3) the subjective idea of a “better world” and (4) passion for a subject or real enjoyment in carrying out a given task.

Thus assuming that the purpose of the activity is to contribute to science, the most likely trigger will be number 4. However if the scientific research in question has a “bigger purpose”, such as to help solving climate change, the trigger involved may be number 2 and/or 3, and still

318 IEAG Report (2014:3).

319 Rogstadius et al. (2011); Blaschke et al. (2013).

if the research will help to improve or save the life of other individuals in any way, even if the latter are not known to the volunteer, the activity may be driven by number 1 and/or 3. It is noteworthy that the combination of two or even three of the motivational triggers is possible in a world where the fear for climate change and the demand for more and better information on the topic increases.

If activity is mainly driven by humanitarianism, it is logical that number 1 will be the main trigger. In the case of activities that concern the collective production of a common good (e.g. Wikipedia and Linux), the motivational trigger may apart from number 4 be also the subjective idea of a better world (3), which would potentially be present in a latent state in numbers 1 and 2 as one may have noticed in the last paragraph.

Furthermore, the conception of cosmopolitan principles would also fit as a major motivational trigger for crowdsourcing and citizen science within the context of sustainable development as it encompasses triggers 1, 2 and potentially 3. Such cosmopolitan principles may be both grounded on the conception of imagined communities of global risk³²⁰, relating to fear (2) or on the classic Stoic understanding of cosmopolitanism based on acknowledge and compassion towards “the other”(1).

4.5.2 Extrinsic Motivational Triggers

Studies on what motivates volunteers has pointed out that other than generally presupposed, extrinsic motivational triggers play an “as important”, if not more important role than intrinsic motivational triggers.

Career-related Motivations

Students may for instance, engage in volunteer work in exchange for academic credits³²¹. Young professionals, in turn, do often engage in volunteer activities aiming career advancement³²²; be it by acquiring new skills to be useful professionally in the future^{323,324}, by gathering work experience for fulfilling job market’s demands (which are high even for young graduates) or by using the opportunity as a way to obtain employment³²⁵, be it within the same organization or through networking strategies carried out during the period of volunteering.

The essence behind this kind of motivation, being highly concerned with external [moral] judgement, as the individual struggles to build credibility and reputation for enhancing his/her chances in the job market, do place the volunteer within an accountability-based mechanism even if there is no monetary transactions taking place. For that punishment is implicit in this scenario in form of “reducing the chances for gaining employment” instead of “threat of job loss” (in the case

320 Beck (2011).

321 Johnson-Coffey (1997).

322 Riecken, Babakus & Yavas (1994).

323 Thippayanuraksakul (1989).

324 Gora & Nemerowicz (1991).

325 Unger (1991).

of employees). Thus this kind of motivational triggers, closely related to the concept of bureaucratic accountability, may strongly affect performance, and consequently data/information quality.

Other Motivations

Other extrinsic motivations in volunteering are highlighted by Okun³²⁶, who has focused his study on elders; these are: sense of belonging, need for affiliation, gaining prestige or self-esteem, or a way of making friends.³²⁷ These kind of motivations may show to be of high relevance for community-based collaborative research and function similarly to the career-related motivations explained above, as a socially driven accountability mechanism (deeply rooted in conceptions of morality and natural law³²⁸) based on reputation. The threat of reputation loss, thus impaired social relations, will in this case, motivate volunteers to achieve better results, again improving data/information quality.

Political and Interest Biases (to be avoided)

This particular type of extrinsic motivation, is also considered a negative aspect of the collaborative approaches in question and it must be hindered, as it may compromise data/information quality through biased outputs. That is, when the volunteer, or his/her community is/are likely to either enjoy of high benefits, or the opposite, to suffer substantial losses, depending on the outcome of data/information analysis, the possibility that data/information submitted by the volunteer will be loaded with bias, as an attempt to manipulate outcomes, should be taken into consideration.

Notwithstanding, the scenario described above is not an exclusive characteristic of the approaches in question, but a general concern regarding risk taking by the act of trusting someone. As explained in the theoretical framework, trust implies risk, by making the trustor vulnerable (due to the situation described in the above paragraph), however risk may be alleviated through mutual trust, collaboration³²⁹ and other accountability mechanisms, which may be found also outside of bureaucratic structures, such as in the example of “socially driven accountability” exemplified in the last but one paragraph.

4.6 Techno-socio-political Context: restoring value to “trust”

In chapters one and three³³⁰, much of the conceptions to be of use in this section have been explained: the ever increasing complexity of social systems as well as the also increasing perception³³¹ of uncertainty and of complexity in natural systems, have been chiefly prompted by rapid

326 Okun (1994).

327 Bussell & Forbes (2002).

328 See theoretical framework (section 3.3).

329 Based on O'Neill's (2004) concepts of “informed consent” (uncertainty communication and shared accountability).

330 Theoretical framework.

331 Perceived because, it is a relative value. Bureaucratic regulatory systems, as explained, have being built for the purpose of diminishing uncertainty. Today, more information show that there is uncertainty also within “certain systems” after all. Uncertainty may have never increased as a matter of fact, but its perception may have been altered throughout history.

technological innovations, enhancing connectivity³³² and data/information availability. This context, often called “the network age”³³³, has in turn, supported and enhanced systems which serve as means for coping with these complex and uncertain scenarios, such as distributed cognition³³⁴ that leads (in its positive aspects³³⁵) to collaborative, participatory and peer-to-peer common oriented processes including the emergence of decentralized systems³³⁶ as well as the gradual empowerment of the civil society (overlapping with the latter); forming altogether, the background for the current landscape of latent paradigm shifts.³³⁷ The examples to be outlined in the following paragraphs were selected based on the relevance for the present work.

4.6.1 Distributed Cognition Enhanced

Hutchin’s theory of distributed cognition was explained in section 3.6, in the third chapter of this thesis. It does also relate to concepts of collective intelligence. Its enhancement, prompted by the current (rapidly changing) technological context³³⁸, has been connecting people through social networks, reinvigorating old participatory and collaborative practices³³⁹ such as crowdsourcing and citizen science³⁴⁰, and also bringing new conceptions into discourse and practice, such as (among others): cyberscience³⁴¹; open science³⁴², which may be considered to be implied in the latter as it would be hardly attainable otherwise; big data and big data analysis, to be discussed by the end of the present chapter as the relevance of [non-profit] crowdsourcing and citizen science is approached.

4.6.2 Decentralized Systems

“[...] while decentralization or decentralizing governance should not be seen as an end in itself, it can be a means for creating more open, responsive, and effective local government and for enhancing representational systems of community-level decision making. By allowing local communities and regional entities to manage their own affairs, and through facilitating closer contact between central and local authorities, effective systems of local governance enable responses to people’s needs and priorities to be heard, thereby ensuring that government interventions

332 Between humans, between machines and between humans and machines.

333 UN-OCHA (2014).

334 Connecting and expanding knowledge systems and networks.

335 Negative aspects entail threats to individual privacy and consequently to individual freedom, and excess of accountability (undermining trust), as discussed in the theoretical framework.

336 Of production and coordination.

337 See: p.1 (introduction).

338 Where access to knowledge and information sharing is ever increasing.

339 Originally based on distributed cognition concepts.

340 Setting promising new horizons for these practices.

341 Defined in p.46.

342 “Open science is the idea that scientific knowledge of all kinds should be openly shared as early as is practical in the discovery process.” *In*: Nielsen (2012).

meet a variety of social needs. The implementation of SHD³⁴³ strategies is therefore increasing to require decentralized, local, participatory processes to identify and address priority objectives for poverty reduction, employment creation, gender equity, and environmental regeneration.”³⁴⁴

Peer-to-Peer Rationale, Commons, Open Movement and Makers Movement

Here I refer to the decentralization of systems of production, of coordination and of services delivery in the light of the following peer-to-peer rationale:

“Peer to peer is a form of relationality between human beings whereby people can connect to each other without permission, and aggregate around the creation of common value. In human anthropology, and in particular according to the relational grammar of Alan Page Fiske, it is considered one of the four basic human ways to relate to each other. In peer to peer, individuals ‘exchange’ with a totality, without direct reciprocation. Though peer to peer has been documented across all cultures and in each stage of human evolution, the available of a global peer to peer infrastructure of communication and cooperation has greatly extended its scope and scale, from the hyper-local to the global.”³⁴⁵

Which is based in turn, on the notion of “commons”:

“Linked to this capacity of global cooperation around shared objects of creation is the concept and practice of a commons. A commons is a shared resource that is either inherited from nature (and Elinor Ostrom, Nobel Laureate in economics, has documented the rationale and governance of such natural resource commons), or created by human beings, either in the ‘immaterial fields’ of knowledge and culture (this includes for instance free and open source software and shared designs), or by holding productive human capital (machinery and the means of production) in common stock. The commons is not exclusively defined by non-ownership and access, but by some form of common governance.”³⁴⁶

Hence the cyberspace and nature may be considered to be “commons”, as well as “science” (ideally). Ideally because knowledge produced by humans should be available for humanity as whole, to benefit from it. Science has however lost its “common” character over the years due to intellectual property rights and other forms of knowledge retention within power structures. The “open science” premises³⁴⁷ may be seen as an effort for making science “a common” as it should be; especially when it is produced within “a common”, the cyberspace, as in the case of cyberscience.

343 Sustainable Human Development.

344 UNDP (1998:6).

345 Bauwens, Mendoza & Iacomella (2012:230).

346 Ibid. p.158.

347 Defined by Gezelter (2009) as: “transparency in experimental methodology, observation, and collection of data; public availability and reusability of scientific data; public accessibility and transparency of scientific communication; and using web-based tools to facilitate scientific collaboration.” And also related to open knowledge, open source and open access.

The conception of “open science” is part of a much broader movement, which might be called “the open movement”; encompassing multiple forms of “openness”, being the most well-known, the notions of: “open data” (closely related to the discourse on transparency and public accountability), “open source” (related to commons oriented peer production, as a form of crowdsourcing³⁴⁸), “open access” and “open knowledge” (related to open science). The main stand of these movements is based on a critique of centralized ownership of: knowledge, information, data, hardware (open hardware) and others³⁴⁹.

The concept of “open hardware” has been used as the motto for another interrelated movement, which might be called “the makers movement”. This, is formed by small communities³⁵⁰, who by owning hardware (e.g. 3D printers and scanner, laser cutters, etc.) for the production of goods, make this hardware available for use to an extended community (turning it into common goods), with the condition that the digital products³⁵¹ to be manufactured through such open hardwares, are to be “open source” and “open access” (also common goods), as a form of retribution to the peer-to-peer rationale, enabling further reproduction of the product by the extended community with zero marginal cost. This mutual relationship, also to be found in the rationale of trust, as discussed in the theoretical framework, is what would make science, produced in the common cyberspace, that is, cyberscience, an inferable common.

The “makers movement” does also concern (not only) the notion of DIY (do it yourself), in which amateurs venture into otherwise considered “for technicians only” projects.³⁵² For the purpose of contextualization, one could call it “citizen [applied] science”.

Collaborative and Sharing Economy

Such decentralized systems altogether have been also named “The Collaborative Economy”³⁵³, being sometimes confused with concepts of the so called “Sharing Economy” (contained in the latter). In the sharing economy, people make their goods, skills or time available through internet platforms for the purpose of sharing. One can share his/her home, car and other things such as clothes and tools, when the latter are not needed by the owner. This may be done through monetary transaction (with much smaller prices than classic rental services) or just through online reputation systems, where “trust” becomes a form of currency.

There is still the possibility for sharing your home even when one is living there, or your car, when there is an extra place for somebody going in the same direction. The former, has been widespread through the Couchsurfing platform³⁵⁴, where cosmopolitanism, based on hospitality

348 Explained in section 4.1.2 (p.55).

349 Such as systems/institutions. See “Open Money”: [<http://www.openmoney.org>].

350 Some of them name themselves FabLabs: [<http://www.fabfoundation.org/fab-labs>].

351 Technical drawing.

352 Online videos are the mean channel for sharing practices of DIY product manufacturing.

353 “The collaborative economy is defined as practices and business models based on horizontal networks and participation of a community, It is built on ‘distributed power and trust within communities as opposed to centralized institutions’ (R. Botsman), blurring the lines between producer and consumer. These communities meet and interact on online networks and peer-to-peer platforms, as well as in shared spaces such as fablabs and coworking spaces.” *In*: [http://ouishare.net/en/about/collaborative_economy].

354 [<http://www.couchsurfing.org>].

and contact with “the other” is the motto. The latter is a lift system, where monetary transactions take place, but ideally not for profit. In this case, both may be considered to be based on the peer-to-peer rationale for common good.

Unfortunately both of these examples have been used as base for the development of other similar profit-oriented initiatives, such as Airbnb³⁵⁵ and Uber³⁵⁶. In this profit oriented context, people are no longer sharing for optimizing the use of resources or to get to know new people, but for many, it has become a source of revenue, shifting the underlying conception behind these practices. Be it as it may, even the profit oriented initiatives are considered to be decentralized systems, withal within the capitalist rationale, this turns out not to be beneficial for the whole community as such systems or services, do not pay for instance, the same taxes as traditional rental services, making the “competition” unfair.

4.6.3 Empowerment of Civil Society

By drawing on principles that relate power to knowledge³⁵⁷, the empowerment of civil society may be seen as a natural consequence of increased connectivity and access to knowledge and information (thanks to decentralized systems, based on peer-to-peer and common oriented rationales) by individuals, who would otherwise be excluded from power chains (top of hierarchies within organizations).

This empowerment is well illustrated by what has been called “cyber activism”³⁵⁸. Again, an old practice emanating from the multitude³⁵⁹, which has in the cyberspace become much more influential, not just due to the amount of information (sometimes provided by governmental bodies and supposed to be confidential³⁶⁰) and knowledge available, supporting the construction of well-grounded counter-arguments, but also due to the high potential for dissemination of information and ideas, and hence mobilization of crowds, through the internet.

Closely linked to cyber activism, as it may be a consequence of successful examples of the latter, is the increasing potential for public participation in policy- and decision-making. This participatory approach in politics is too, enabled by new technologies, including what the European Commission has been calling “awareness platforms”³⁶¹ and fostered by open data policies, with concerns to transparency and organizational accountability towards the public and other organizations.³⁶² All these concepts relate to the commons based peer-to-peer rationale, fostering decentralization.

355 [<http://www.airbnb.com>].

356 [<http://www.uber.de>].

357 Foucault (1980).

358 Concerning a variety of fields, including humanitarianism and environmentalism, of concern to this thesis.

359 Hardt & Negri (2009).

360 See the case of whistle blowers in, for instance in The Guardian’s article: Anon (2015b).

361 Paramount for supporting a data revolution through collaborative approaches, CAPS are explained in detail in section 4.4.

362 The current general focus on accountability has been discussed in the theoretical framework and it is key for understanding the rationale behind hypothesis development (in chapter 6).

4.6.4 Trust and Accountability in the Network Age

“If we are to find wider truths, we must build wider trust. That will take more than two people: It will take us all.”³⁶³

Finally, the most relevant take away concerning the current techno-socio-political context is the value of trust in all the practices (collaborative research and problem solving, participatory policy and decision making, commons oriented peer-to-peer production) and phenomena characterizing emergent paradigm shifts. Nearly all concepts outlined in this section are, in opposition to [modern] accountability systems within hierarchical structures, invariably based on mutual trust and on “natural accountability” as a resultant of trust³⁶⁴.

The only conceptions presented in the last paragraphs which are not invariably based on mutual trust are those profit-oriented practices within the Sharing Economy³⁶⁵ and the concept of Open Data, as it has been embedded in the current discourse on public [modern] accountability³⁶⁶. The latter will be discussed in detail as part of hypotheses formulation in chapter six.

4.7 Relevance of [non-profit] Crowdsourcing and Citizen Science

As it has been argued in the introduction, a data revolution is pivotal for unlocking the way for the momentous consolidation of the latent paradigm shifts presented in this chapter and thereupon supporting the attainment of the Sustainable Development Goals. Interestingly, latent paradigm shifts provide sets of practices, such as collaborative approaches for data/information collection and analysis (crowdsourcing, citizen science and citizen journalism), which are in turn, indispensable for the realization of a data revolution.

Within the techno-socio-political context, such collaborative approaches emerge together with latent paradigm shifts rooted on notions of mutual trust. The data collected and analysed and, information produced and shared by volunteers will fill data/information gaps not just for helping organizations to monitor the SDG and deliver immediate aid when needed, through the so called augmented products³⁶⁷ and timely data or as a tool for visualizing trends, for pointing to where one should investigate³⁶⁸, but also for empowering communities to take their own decisions, contributing along with other stake-holders to discussions informing policy- and decision-making (decentralization).

Thus the inclusion of [non-profit] crowdsourcing and citizen science as valid sources of data/information, will arouse those subjugated knowledges and place them in the centre of the discourse informing policy- and decision making (verbal agreements of shared reality) along with those knowledges emerging from power structures (hierarchical institutions). This foucaultian notion, discussed across sections in the theoretical framework (chapter three) relates with the

³⁶³ Carolan & Bell (2003:243).

³⁶⁴ Conception is explained in detail in the theoretical framework (section 3.3).

³⁶⁵ Which may be seen as a deviation from the original principles of the commons oriented peer-to-peer rationale.

³⁶⁶ All meanings and conceptions are explained in the theoretical framework (chapter three).

³⁶⁷ To be discussed in the next chapter.

³⁶⁸ *Levine*, in interview.

concepts of cyber activism as it is, if not the only, probably the best chance for the multitude to defy such crystalized power structures.

New technologies, combined with the advent of internet are the means for enabling volunteers to perform these activities (collecting, analysing and sharing data/information) in an efficient and transparent manner. CAPS are one of the examples which will make the bridge between the global (through knowledge, information and data availability in the cyberspace) and the local communities.

Crowdsourcing and citizen science approaches, will show to be the approaches holding the highest number of sceptics concerned with the data/information quality resulting from these sources. This issue will be discussed in detail in chapters five and six as it is the central topic of this thesis. For now, it is paramount to highlight the great importance of these approaches for a data revolution. There are two main issues urging the support of crowdsourcing to be solved.

The first regards the unviability of data/information collection solely by professionals (be them scientists or journalists), for the simple fact that there are not enough of them to cover all issues on the planet. This condition is aggravated by emergency circumstances, urging timely data. Nowadays there are technologies (remote sensing and computer algorithms) collecting data which could result in valuable information for informing policy and decision making, also in emergency. The problem here is the amount and character of data collected. Thus our second issue which may soon become the solution is called big data.

Just as the notions named through this chapter, data has too, been starkly influenced by the network age³⁶⁹, it has become “bigger”. Big Data, controversies on terminology left aside, generally refers to an extremely large, fast growing, diverse and complex amount of data sets which existing technologies are still unable to fully process, although there are plenty of successful examples of big data processing as for instance through machine learning.

Relatively new and relevant sources of data/information have emerged, such as among others, “the crowd” (e.g. through social media) and satellites’ sensors, for which there is no consensus on how should these new data/information sources fit the existing system, accounting that it is considered fairly difficult to process the massive number data, be them images or tweets.

Big data is a big promise, a paradigm shift, on the assumption that it can be conquered. It is said that one will be able to make accurate predictions for the future through big data analysis. Yet complex data sets have been collected and stored and their respective categorization and analysis is many times, as in the above example, still impossible for a computer to perform. The barriers are encountered in limitations of artificial intelligence (e.g. image recognition and judgement analysis) and in an apparently solvable issue: the lack of global data standards (one of the objectives of the data revolution).

The Big data challenge may be tackled through two approaches: waiting for technology to make up to it, which is very likely to happen, we just do not know how long it will take, or as

369 UN-OCHA (2014).

briefly mentioned, resorting to the crowd (through distributed cognition³⁷⁰), that is, relying on crowdsourcing until it happens.

Since we cannot afford to wait indefinitely for technology to fill the information gaps (especially concerning the interrelated issues of climate change and population growth), crowdsourcing may be considered a valuable bridging solution, fundamental for the data revolution.

370 “Cognitive processes can be distributed between humans and machines (physically distributed cognition, Norman, 1993; Perkins, 1993) or between cognitive agents (socially distributed cognition).” *In*: Lehtinen et al. (1999).

5 Interviews' Outcomes

As it was explained in chapters one and two, the main research question of this thesis is: what lays behind the phenomenon of reluctance of organizations and institutions to embrace crowdsourcing and citizen science approaches for data collection and analysis in a [non-profit] level? Nevertheless, in order to collect empirical data through interviews, aiming to draw an overview of how NGOs, UN agencies and governments interact with emerging technologies, more specifically involving volunteers³⁷¹ (the public) in the collection and analysis of data, as in crowdsourcing and citizen science, two other more pragmatic research questions were formulated. These have referred to (1) the positioning (or behaviour) of organizations vis-à-vis crowdsourcing and citizen science and the factors determining such behaviour; and to (2) the generally perceived challenges of crowdsourcing and citizen science (answered pragmatically). The open character of the first question has allowed more subjectivity in interviewee's answers, leaving more room for interpretation of the empirical data; whereas the second question was formulated in a way which has led to more concrete and straightforward answers. Each of the two questions has led to empirical data informing two initially distinctive, but which have shown to be correlated lines of research. The insights brought by these two lines of research through constant comparative analysis and theoretical sampling were fundamental for the construction of the hypothesis answering the question regarding the reason behind the phenomenon in question, to be formulated in chapter six.

The first research question has led to answers which unveil the decisive role of accountability in determining organizational behaviour towards crowdsourcing. The second pinpoints the two main perceived challenges of crowdsourcing to be "data/information quality" and "little understanding", being the first the most strongly advocated one (by interviewees, reflecting the literature on the topic).

5.1 Organizations vis-à-vis Crowdsourcing and Citizen Science: unveiling the decisive role of accountability

For an overview of the scenario, the following question, open to subjective interpretations and answers, was formulated during the interviews: "which of the three actor groups of concern to this study (NGOs, UN and governments) is more likely to act positively toward crowdsourcing and citizen science approaches and why?"

When asked this question, there was no overall consensus among interviewees. The main reason for the variation lies with the fact that some interviewees did not answer the question generally, but considering a scope (action field; reach; impact), age and/or size of organizations, as it will be explained in the next paragraphs.

It is relevant to highlight the fact that during interviews, I have referred to "NGOs" in general when posing the questions and some of the interviewees have made clear distinctions within this broad category whilst answering these questions, differentiating "small" from "big" NGOs,

371 Mostly non-specialists and in the case of crowdsourcing and citizen science, often anonymous.

whereas other did not, what has hindered the analysis process. Nevertheless it became noticeable, due to the wide variation between interviewees' points of view, sometimes even contradictory, that also when not explicitly claimed, interviewees had different types of NGOs in mind when answering the research question. Throughout the data analysis process, the variations within NGOs' landscape have shown to be much more complex, going beyond the "size" of the organization and showing the high importance of the "scope" (directly influencing size and vice-versa) and "age" (also interrelated with the other two) of the latter. These determinants have shown to be applicable for organizations in general, not being restricted to NGOs.

For instance, all the three determinants concerning a government are also likely to influence its behaviour towards innovative technologies and procedures which involve uncertain outcomes. In this sense, local governments shall behave differently than national governments, and the government of Kiribati will behave differently than the Russian government. The UN in turn, may be considered to be part of a more homogeneous landscape than NGOs and governments, particularly when it concerns size and age but not totally free from the influence of scope, as it varies between different UN agencies.

Once more due to the generalist character of the question posed, governments too, were considered by the interviewees to behave differently according to some particular aspects which may interrelate to the three determinants outlined above. A broad classification was made between developed and developing countries, however, variations between each of them were expressed. Amongst the developing countries, some indicators have shown to be of high relevance: character of regime (where individual freedom and privacy may be constrained), level of corruption (lack of transparency) and political stability (social unrest; ongoing armed conflicts).

Before moving forward to the immediate analysis, I would like to clarify the conceptions underlying the three determinants in question based on their definitions. By size I mean *the relative extent of something; a thing's overall dimensions or magnitude*³⁷², which may be measured for instance by number of employees and supporters, number of headquarters and field offices, and amount of financial capital circulating. By age I understand *the length of time that a thing has existed*³⁷³, and finally by scope of the organization, I mean *the extent of the area or subject matter that something deals with or to which it is relevant*³⁷⁴.

The definition of scope is the most complex as it implies manifolds determinants, which may in turn be affected by, and affect the other two. When one talks about the "scope" of an organization, this may refer to: (1) the area that something deals with; (2) the subject that something deals with; (3) the area to which something is relevant and; (4) the subject to which something is relevant. Numbers 1 and 2 concern the focus (or general objectives) of the organization. These take spatiality/area (e.g. global, local) and subject matter (e.g. human rights; environmental protection) into consideration. Numbers 3 and 4 regard the reach or impact of an organization through its actions. The latter will also be assessed based on spatiality/area and subject matter. It is noteworthy that the subject matter is highly relevant as not all subject matters have the potential

372 In: Oxford Online Dictionaries: [<http://www.oxforddictionaries.com/definition/english/size>].

373 Ibid. [<http://www.oxforddictionaries.com/definition/english/age>].

374 Ibid. [<http://www.oxforddictionaries.com/definition/english/scope>].

to arouse wide political interest, as some are much more sensitive than others depending on the current global discourse.

Many, but not all³⁷⁵ INGOs for instance, may undertake actions in a local level for approaching subjects of global concern (e.g. human rights) and therefore having not just a local, but also a global impact and eventually also reaching other related subject matters such as governance and international politics.³⁷⁶ This is the case for the Human Rights Watch (HRW) or Amnesty International, but not for World Vision, although all three are INGOs. The first two, are committed to denounce inadmissible situations in a global scale, mobilizing global actors to pressure national and consequently local leaders, whereas the last, being also present in many countries does not focus on mobilizations of global actors for tackling an issue, but much more on how to alleviate the problem in a local scale.

5.1.1 Preliminary Analysis and Outcomes

Meier regards humanitarian and conservation NGOs as being the most likely to act positively towards crowdsourcing, rather than governments, which he sees as the less likely, believing that governments may feel threatened by it and are generally slow in adopting new technologies. Hence, according to *Meier*, at the one side, crowdsourcing, or non-official data/information collection and disclosure, is perceived by governments³⁷⁷ as a form of threat. *Olafsson*, *Verity* and *Iacucci* do also agree with this statement in different ways.

Olafsson argues that the availability of information coming from alternative sources could *potentially expose the lack of capacity of the government in responding* (GO: 08'20")³⁷⁸. Moreover, *Olafsson*, *Meier* and *Verity* stress that some governments are more likely to feel threatened than others, depending on the political context (conflicts; social unrest; corruption...), where in most critical situations governments may fear the empowerment of the masses through the disclosure of so far confidential information. *Iacucci's* statements reinforce the ideas above and bring about another perspective to the inquiry, by addressing the peculiarity of government's relationship with the general public, which is very different than that of the latter with the UN or NGOs:

"[...] I would put government on the side because I think that government is very different from the way it functions and from their fears [...]" (AI:18'46")

"[...] governments is a completely different structure, a government is elected, a government normally wants to be re-elected [...] for the government the relationship with their own citizens, it's a very different type of relationship than the one that the UN has, or the one that NGOs have." (AI: 19'57")

375 This is important to highlight, once this is the usual way for differentiating NGOs: the international and the others.

376 In the theoretical framework (section 3.2.4), the role and impact of NGOs, INGOs and IOs are discussed in detail.

377 He acknowledges that there are exceptions.

378 "[...] it could show that deforestation is much higher than what official reports are saying. And you have no way of filtering that, you have no way of stopping that." (GO: 08'28").

This line of thought does support the notion that governments fear the disclosure of information which may have a negative impact in public opinion (also in non-critical contexts), whereas addressing at the same time government's caution in adopting any strategy entailing risk, once due to negativity bias³⁷⁹, public opinion will give more weight to failures than to successes in the elections. Thus governments, may be considered to be risk averse, as far as *they are concerned with how to manage the expectations of their own people* (AI: 17'30")³⁸⁰. The determinant here is scope, as "to be re-elected" may be considered as a general objective from the part of governments. Moreover, it is crucial to note for the purpose of the development of the final hypothesis that this kind of relationship between governments and their people is one of accountability.

Furthermore, in the other side, *Meier* asserts that in addition to the "threat" perceived by governments, being generally slow in adopting new technologies is an extra factor influencing governance behaviour towards novel approaches. Through this statement he marks a key point for assessing the actor groups' behaviour towards risk, as the same point will be mentioned by other interviewees³⁸¹. Through constant comparison between interviews' data and existing literature on the topic, it was possible to gain a more refined overview from the scenario, which has shown that results from empirical data analysis were in alignment with the literature.

So it turns out, that "speed" is not the determinant here. Firstly, "speed in adopting innovative technologies and procedures" refers to the key indicator "inclination towards risk"; that is, the more risk averse an organization is as a whole, the slower it will be in the adoption of innovative technologies and procedures. The latter is held to be a result from the three determinants (scope, age and size). Scope may be considered the most important determinant of risk aversion among the three. Nevertheless with concern to "speed", risk aversion will be drastically aggravated by "age", whereas "size" may or may not be implied.

Organizational theories, particularly those focusing on bureaucratic structures, are highly relevant for the full comprehension of this scenario, where hierarchical bureaucratic structures tend, due to initially, individual risk aversion (deriving from fear of punishment, thus urge to maintain the *status quo*), to "crystalize" over time and as they grow, decreasing an organization's staff rotation and ultimately the organization's overall willingness for risk taking, making them slow in the uptake when concerning novel strategies³⁸². Another factor resulting from organization's "age" and influencing the "speed in the uptake", as it concerns accountability, is the weakening of discretion³⁸³. Once more, both of the factors elucidated in this paragraph may be explained through relations of accountability; the first, within organizations³⁸⁴ and the second, between organizations and between organizations and the public.

Despite of acknowledging the role of accountability between governments and their people, by confirming the possibility that some governments may feel threatened by the disclosure of

379 See: theoretical framework (section 3.2).

380 "[...] I would say that it is a matter of risk, governments are still very afraid of this kind of projects in terms of their ability to manage it, and the ability to manage expectations from their own people." (AI:17'30")

381 *Pisano; Verity*.

382 Explained in detail in the theoretical framework (section 3.2).

383 Hambrick & Finkelstein (1987) *in*: Miller (2002).

384 See theoretical framework (section 3.2).

non-official data/information, *Verity* holds this actor group as the second more likely to act positively towards crowdsourcing and citizen science, due to its *broader than NGOs but still narrower focus than the UN* (AV: 30'08"), emphasizing the relevance of scope. As we have seen, scope is a multifold determinant, and based on *Verity*'s opinion, one could infer that he refers to NGOs which do not have a broader (global) reach or impact through their actions (such as HRW).

With regards to NGOs, *Meier*, as we have seen, considers the latter (particularly in the environmental and humanitarian sector) to be the most likely amongst actor groups to embrace crowdsourcing as part of their data/information collection and analysis processes. *Verity* agrees with *Meier* in what concerns NGOs as they are generally more focused on the locality, once more giving emphasis to scope. *Verity* does not highlight any specific field of action though. *Iacucci* shares *Meier*'s and *Verity*'s vision regarding NGOs and crowdsourcing, however in opposition to *Verity* and *Meier*, she does not specify any field or scope.

In contrast, *Pisano* sees governments and not NGOs, as the most likely actor group to cope with crowdsourcing (and citizen science) approaches, especially regarding projects for environmental monitoring and emergency response.

Indeed many local and national governments, notably the United States³⁸⁵, have relied or rely on crowdsourcing for data/information collection. Other examples may be traced in the Philippines, Indonesia, Mongolia, Nepal, South Sudan, South Africa, Norway, Sweden, France, United Kingdom, Spain, Ireland, Haiti, Canada, India, Somalia, Uganda and Italy.³⁸⁶ As *Hattotuwa* states in interview: *any government in the world today is acutely aware of the social media [...] how they use it is of course hugely varied* (SH: 46'16").

In this way *Pisano* regards governments as being generally very aware, more than organizations at the international level (particularly the UN), tending to agree with *Verity* in matters of scope, but holding a particular opinion regarding NGOs as it will be discussed further.

Moreover another interviewee, *Avan*, also upholds scope as the most relevant variable determining the inclination of one or another actor group in early adoption of new technologies, specifically crowdsourcing, since homogeneous organizations, maybe governments and small NGOs, not international organizations (here INGOs are also implied), due to its closeness to and understanding of the voice of the crowd, are those more likely to act positively towards crowdsourcing.

Taken into consideration the majority of interviewees' positioning, NGOs are generally held as the most likely to act positively towards the approaches in question, once they are usually faster than the other two (governments and UN) in adopting new technologies, probably as NGOs are typically less averse to risk as a result from a variety of factors combined (narrower scope, age, size) as *Verity* points out by inferring that they are *a little bit less worried about making sure everything works* (AV: 26'43"). Keeping this assumption in mind, let us analyse some important considerations.

The willingness of taking higher risks, including the adoption of innovative technologies and procedures, for achieving a desirable outcome is, based on the considerations brought by the

385 See the example of the United States Environmental Protection Agency: [<http://www2.epa.gov/innovation/federal-community-practice-crowdsourcing-and-citizen-science>].

386 Haklay et al. (2014).

theoretical framework, directly linked with the issue of accountability, both [modern] accountability, related to bureaucratic structures and natural accountability, resultant of trust (based on mutuality). Matters of accountability are in turn, related to all three determinants previously mentioned: scope, size and age of an organization, and will in addition support the argument of “closeness to and understanding of the voice of the crowd” in the upcoming paragraphs.

Apart from being indirectly accountable to the public and by choice to a local community in a particular circumstance, the UN agencies are invariably bounded to national governments and vice versa, being both expected to provide explanations to each other regarding their actions and methods of choice, as they are directly accountable to each other. However before the UN, governments are firstly directly accountable to and for³⁸⁷ their own people, as it was previously discussed, when stated that governments have much more at stake as they have the duty of explanation to their people, for they need to be re-elected. *Witt*, makes in interview, a strong argument addressing this bound between national governments and the UN: *as part of the UN system, we are bound to work with our pointed ministries within a country. It would really cause a problem if we would say – well sorry, we'd rather take someone else's data* (RW1: 24'49"). And he continues:

“Because that is part of their mandates, we expect and we assume that the data that they are reporting are the best that they are able to collect, because it is part of their official function. And secondly, being the organization that we are, UNEP, the environmental program, as an inter-governmental organization, our official counter-parts, with whom we must interact, are the ministries of environment or ministry of environment and natural resources or you know some variant on that. And that means that we are, I will not say legally bound, but that is part of our mandate; those are the institutions that we are dealing with at the country level. And that means that if we use other sources of data and information, then we have to be able to explain to those ministries, why we might select other sources over them, the official source of data on the environment for their country. So it is really an institutional arrangement that is made as part of the United Nation system. If overnight we have decided just to accept data coming from any number of citizens within country x, y or z, we would have a lot of explaining to do, to the ministry which is our national counter-part within a country. So there would have to be a really good strong rationality to using other than official reported statistics.” (RW1: 21'08")

So, taken the considerations above, is it possible to state that NGOs are less accountable than governments and UN agencies? *Pisano* contradicts the majority who sees NGOs as being more open to crowdsourcing approaches, by pointing out that *today you won't find a chief of an NGO saying let's let's invest medium in creating a citizen based platform* (FP1: 20'28"). *Pisano* is careful when stating that this fact excludes NGOs which are specialists on these approaches such as *Internews*³⁸⁸,

387 In this sense accountability equals responsibility.

388 See: [<https://www.internews.org>].

ICT4Peace³⁸⁹ and Nethope³⁹⁰, from which representatives were also interviewed, and who might have responded based on their organization's view or on others within their business network.

Pisano says that humanitarian NGOs such as, using his example, the HRW are cautious when considering crowdsourcing approaches. At this point, we know that *Pisano* was referring to INGOs in general³⁹¹, which by having different scope (focus and reach) and considerably bigger size than other NGOs, will probably present another behaviour towards crowdsourcing and citizen science than the latter. Following this rationale, it is possible to assert that there is no contradiction in *Pisano's* statement as he refers to another spectrum of the NGOs' landscape and as he does actually agree with the other interviewees in what concerns international organizations as not being very likely to adopt such approaches.

In order to scrutinize *Pisano's* point of view, I have also talked to *Levine* (program director - HRW), to follow up on this issue. *Levine* does see crowdsourcing for humanitarianism as a promising approach, but ends up confirming *Pisano's* note by naming issues of crowdsourcing (verity, privacy, security) that must be solved before it is officially adopted. It turns out that the HRW is concerned with its reputation and credibility³⁹², like the UN or governments, as due to their wider scope of reach and impact, they become more accountable³⁹³ than other NGOs. *Levine* says that it was a long and hard way for the INGO (HRW) to achieve international credibility, and they are not willing to put it at risk, once it is *all they have to fight for human rights*.

At this point, supported by the above argument on credibility and reputation³⁹⁴, aspects which's relevance is affected by the three mentioned determinants (scope, size and age), it is possible, in alignment with the consulted literature on the topic³⁹⁵, to conclude from the empirical data collected through interviews, that accountability mechanisms (in different forms³⁹⁶) are the major issue shaping organizational behaviour towards crowdsourcing and citizen science. Some interviewee's statements, such as *Witt's* and *Levine's* quoted above, support this conclusion with regards to accountability. In addition, one of *Avan's* statements during the interview does assuredly imply the major role of accountability in shaping organizations' and their employees' behaviour *vis-à-vis* the approaches in question. He says that they (he and his organization) cannot use solely crowdsourced information to take a major action (in cost and impact), like a military operation. But for a small cost and impact operation, maybe.

The larger the NGO's reach and impact (scope)³⁹⁷ and also its size, the greater its accountability to all the other spheres (governments, UN and public), hence tending to act in a similar way as the UN and governments regarding accountability for its actions and publications, as they hold similar

389 See: [<http://ict4peace.org>].

390 See: [<http://nethope.org>].

391 With broader scope concerning reach and impact.

392 Deeply rooted on accountability principles (modern and natural). See: section 3.3 in the theoretical framework.

393 In different levels.

394 Also explained in the theoretical framework (section 3.2).

395 See: theoretical framework and literature review. Particularly: Luoma & Goodstein; Hambrick & Finkelstein. *In*: Miller (2002).

396 See: theoretical framework (section 3.3).

397 Mostly represented by INGOs.

if not equal or even higher (especially when compared to governments) levels of established credibility, especially with respect to the civil society. Thus small, locality focused NGOs, by having none or little reputation to preserve (less accountability to the three spheres), are expected to be more willing to take risks if this may represent a chance of better concrete outcomes.

As the UN (in opposition to governments), NGOs in general have the choice of being accountable or not for and to local communities in particular situations. The matter of choice from the part of the service provider was not mentioned during interviews, but it may be considered as a relevant differential, once by influencing people's expectations, which tend to become lower in this situation, it fosters open dialogues where risks are known and accountability is shared. This aspect does also relate to other factors emerging through interviews' analysis: "closeness to the people" or "understanding the voice of the crowd", all concerning mutual relations of trust with "the people" (crowd, community, end beneficiary).

Small NGOs (less risk, less expectation), as we have seen, were held by interviewees as being the most likely to fit the characteristics mentioned in the last paragraph. But so were governments, placed before IOs (UN and INGOs). Notwithstanding, based on the argument of "choice" with concerns to UN and NGOs in general, it may be argued that the latter (including the UN), when directly involved with the locality are more likely than governments to engage in a relation of mutual trust with the beneficiaries, as for the government, higher expectations (related to the obligatory aspect of governmental accountability towards its people) and nowadays, higher levels of mistrust, may hamper this kind of relationship.

This mutual relation of trust can be established through collaboration, where "efforts" towards a common goal from the part of the organization (engaged by choice) are as praiseworthy as "outcomes". In this scenario risk taking becomes acceptable for the organization once there will be no "punishment" in the case of unsuccessful projects from the part of the people. No successful outcome is promised and the process is transparent; the community understands and accepts risk; there is no risk transfer, no enforced accountability (e.g. contracts) and no punishment in this relationship. Furthermore, by involving volunteers in the process, crowdsourcing and citizen science have the potential to be the most suitable approach for data/information collection, analysis and sharing, particularly when grounded on the above described mutual relationship. Moreover [voluntarily] involved people become morally accountable for their contribution in a given project, especially when it concerns their own local community; in this context it is consequently likely that data/information quality increases along with the chances of a successful final outcome.

With regards to UN agencies, despite of the factor "choice" with regards to intervention in the locality, which could possibly lead to positive outcomes, many interviewees (*Pisano*, *Verity*, *Avan*³⁹⁸) consider UN agencies as the less likely to adopt crowdsourcing and citizen science as valid data/information sources. *Pisano* sees a low "level of acceptance", meaning "willingness to act", from the part of the UN. He says that this "unwillingness to act" from the part of UN agencies rests on three factors:

398 Interesting enough, those working for the UN.

Firstly because according to him, these organizations (UN agencies) are “old”, slow in the uptake. As we have seen, the combination between size, age and scope will shape an organization's willingness to take risk. Particularly the age and size of an organization may lead to inertia³⁹⁹, that is, to a tendency to remain the same, averse to change, for it entails risk, directly influencing the speed with which innovation is adopted.

Secondly, the same inertia may be considered the source of another widely acknowledge issue regarding crowdsourcing and citizen science, which will be approached in detail in the next section: little understanding. In this case *Pisano* and *Olafsson* are agreement with *Avan* who argues that there is a gap between the existing knowledge on the topic and what is known by leaders inside the UN (*and probably everywhere else* - he adds).

Thirdly *Pisano* tackles the budget problematic. He says that even in the case where an UN agency would be willing to adopt crowdsourcing and citizen science approaches for a project, they are dependent on budget coming from countries (stressing once more the strong bound mentioned by *Witt*), which in their turn, might not have achieved “that high level of acceptance”. This argument may sound contradictory since *Pisano* holds national states, before UN and NGOs, as being the most inclined to adopt crowdsourcing strategies, however it is worthy to stress that there is a general lack of awareness (to be addressed in the next section as a main issue) within all three actor groups dealt with in this chapter, and although many governments have shown to be open in very specific fields, the majority is still aside of the ongoing discussion on the topic.

Verity says that the UN has a too broad scope for taking risks. They want to make sure it is going to work, since they are always preparing for scaling up, making it global - he states, once more making use of the argument based on risk and consequently on accountability (his first mention was regarding NGOs by not worrying as much as UN or governments that everything works perfectly).

To conclude this section, we were able identify three correlated factors, which by influencing the level and quality of an organization's accountability relations⁴⁰⁰, do also determine an organization's inclination for early adoption of technologies and procedures (risk taking): scope, size and age. These, resulting from empirical data analysis have shown to be in alignment with existing literature on the topic⁴⁰¹ and affect all three actor groups.

Scope

The matter of scope is most relevant in two levels. The first regards the reach and impact of an organization in relation to other organizations. In this case, the higher its reach and/or impact, the more accountable will the organization be towards other organizations and the public, once external oversight (more visibility) will be also increased. In this scenario, organizations become more risk averse as they will try to protect their credibility and reputation under constant external scrutiny. The second level concerns another facet of scope. In this, the closest to the people, to locality, the

399 Hambrick & Finkelstein (1987) *In*: Miller (2002).

400 Based on theories presented in the theoretical framework (section 3.2 and 3.3) .

401 Luoma & Goodstein; Hambrick & Finkelstein. *In*: Miller (2002).

more likely the organization is to adopt early new technologies, particularly crowdsourcing and citizen science. A better understanding of the voice of the crowd as well as a mutual relation of trust, including risk-taking by all parts (shared accountability) and moral commitment by volunteers (more quality), are very likely traits to play an important role in the context in question.

Size and Age

Old and big (thus complex) hierarchical structures are characterized by inertia, with low staff turnovers and little flexibility in working methods. Both of these aspects are held as “counter innovative” and tend to slow the process of recognition, acceptance and adoption of newly available tools and technologies, being usually surpassed by the private sector and by smaller and newer non-profit organizations. Such organizational inertia, apart from being inefficient, as it was discussed in the theoretical framework, are a result from complex relations of accountability within the organization, starting in the level of the individual and emanating to the organization as whole. Both in the individual level, based on bureaucratic hierarchies, and on the organizational level, based on inter-organizational relations, accountability, based on fear of punishment, will lead to risk aversion.⁴⁰²

For the purpose of record, I would like to note that there is one extra factor, not directly related to accountability which was highlighted by *Pisano, Levine* and *Avan* and which may be decisive (under the current scenario, where donors too are reluctant to adopt crowdsourcing and citizen science) in shaping decision making regarding these collaborative approaches mediated by new technologies: limited resources; in particular financial resources (mainly applicable to small UN Agencies and NGOs), but also dependent on the latter, human resources (in house expertise) and infrastructure.

5.2 Perceived Challenges of Crowdsourcing and Citizen Science: a pragmatic⁴⁰³ view

After approaching the matter in a more general and subjective level (based on the first research question), a second question was posed aiming to gather more “concrete” information regarding the perceived challenges of crowdsourcing and citizen science. The question was formulated as follows: “which are the most frequently named issues of these approaches⁴⁰⁴ that may be hampering wider acceptance and adoption, and what are the proposed respective potential solutions?”

It is a consensus among the interviewees (also in the literature⁴⁰⁵) that “reliability” of the data/information source is the major issue of crowdsourcing and citizen science approaches. That is, is the source (the volunteers) able to be constantly good in quality or in performance? Thus I understand reliability as referring also to other two main issues named during the interviews:

⁴⁰² All argument is discussed in detail in the theoretical framework.

⁴⁰³ “Dealing with things sensibly and realistically in a way that is based on practical rather than theoretical considerations” - Oxford Online Dictionaries: [<http://www.oxforddictionaries.com/definition/english/pragmatic>].

⁴⁰⁴ Crowdsourcing and citizen science.

⁴⁰⁵ As explained in the literature review.

stability of data/information source (availability and motivation of the crowd/volunteers) and particularly to data/information quality, including (among other indicators) information validity and accuracy as the biggest concern from non-expert interviewees, also reflected in the literature.

After data/information quality, the second most named issue, particularly by expert professionals, was “little understanding” (also misunderstanding, lack of awareness and generational or cultural lag). The issue of bias (to be referred to as prejudice⁴⁰⁶) was also named by some expert interviewees as being even more critical than little understanding; but prejudice may also be a result from little understanding, as it will be discussed in section 5.2.3. Other mentioned issues ordered by number of mentions were: information sensitivity/ethical concerns (security, privacy, ownership) and limited resources for implementation.

The next sections will discuss the two most mentioned issues (data/information quality and little understanding), by making use of the interviewees' arguments, as well as suggesting potential solutions for dealing with each of them. It is important to stress that, as we have previously seen in chapter four, the activity fields related to crowdsourcing and citizen science are vast and diverse, thus each of the above named issues must be approached in accordance with the context of data/information collection and especially to its primary utility.

5.2.1 Information/Data Quality

Let us start by differentiating *quality control* from *quality assurance*. According to the international standard ISO 9000⁴⁰⁷, quality control is *a part of quality management focused on fulfilling quality requirements* and quality assurance is *a part of quality management focused on providing confidence that quality requirements will be fulfilled*.

This means that in the case of information, quality control happens closer to the product. It is the function to be carried by those (usually professionals) concerned with information/data gathering and first analysis. In the case of crowdsourcing and citizen science, quality control will be performed by project designers, the crowd or local people (ideally, after capacity building), a proper technical infrastructure (to be addressed in detail further in this chapter) and by expert reviewers, information analysts and designers, concerned with the final product.

Quality assurance is carried out by intermediates, organizations which will make sure that the information obtained is qualified by double checking the output specifications before the release of the product to the final user.

Nowadays, even when data/information is collected or analysed by professionals who are supposed to collect high quality data/information, quality assurance is still carried out additionally. The question here will be whether or not quality assurance frameworks are also applicable or appropriate to crowdsourcing and citizen science data/information, considering the great concern regarding the quality of this kind of data/information.

406 Since the term “prejudice” is more accurate in the given context, bias will be substituted by the latter in this work.

407 ISO9000 (2005).

Information or data quality has multiple dimensions and a variety of quality assurance frameworks is available from statistic divisions of national governments, international and supra-national organizations and research institutions. The UN relies on the “National Quality Assurance Frameworks” (NQAF) developed by the expert group on NQAF upon request of the statistic division of the UN. The European Commission statistic division has published the “Quality Assurance Framework of the European Statistical System (ESS QAF)”. Both are extensive and complex frameworks, being also extremely similar in their contents. Therefore we will in this section, deal solely with guidelines for managing statistical outputs^{408,409}, which are the same in both frameworks. The following data outputs must according to these institutions be assessed to ensure data quality: relevance, timeliness and punctuality, accessibility; clarity, coherence and comparability; and accuracy and reliability. Each of these outputs, is provided in the ESS QAF with guidelines on methods to ensure the respective matter at institutional and product/survey levels, the latter being of more relevance to this study.

Before each of these outputs is explained and analysed in the context of crowdsourcing and citizen science approaches, some relevant aspects must be addressed. Firstly, it is important to keep in mind that volunteered (or citizen generated) data/information is often referred to, by interviewees, as “complementary data”, however it should not be understood as a synonym of metadata (data-set providing information on other data), although it may sometimes be the case, as for instance in a crowdsourced feedback on an informative article, but most of the times it will serve as a primary information source, which can complement other primary information sources for the purpose of validation.

Secondly it is paramount to highlight the issue of uncertainty (not restricted to crowdsourcing and citizen science approaches) as it was addressed in the theoretical framework. Jerome Ravetz⁴¹⁰ and Silvio Funtowicz⁴¹¹ have developed a life-long work on the topic, particularly concerning science objectivity and data quality, including the concept of “post-normal science”, a methodology for managing complex science related issues⁴¹² more specifically when facts are uncertain, values in dispute, stakes high and decisions urgent⁴¹³. Among other issues and proposed solutions, part of the developed methodology to be further presented in this chapter, Ravetz and Funtowicz call attention to the fact that even in the scientific method, “the most certain of all methods”, there is space for uncertainty, especially when it regards outcomes loaded with values of particular relevance for stakeholders. Thus it is argued that uncertain data/information does not mean useless or bad data/information, but with the proper management and quality control framework it may bring great benefits in supporting decision making processes. There are much of uncertain

408 United Nations Statistic Division (2012:36-47).

409 European Statistical System (2011:21-28).

410 Currently Ravetz is an independent scholar and self-employed consultant, working mainly on problems of the management of uncertainty in risks and environmental issues. See: [<http://www.jerryravetz.co.uk>].

411 Professor in the Centre for the Study of the Sciences and the Humanities (SVT), University of Bergen. Google Scholar website: [<http://scholar.google.de/citations?user=GIE0bhkAAAAJ&hl=en>].

412 Funtowicz & Ravetz (1992; 1993; 1999).

413 Funtowicz & Ravetz (1991).

data/information in circulation today, claimed to be certain; these are more threatening to organizations and society than openly uncertain data, with proper assessment and communication, involving the notion of informed consent⁴¹⁴ in decision making.

Thirdly, other than it may be generally assumed, citizen generated data/information is not as matter of course incompatible with quality assurance frameworks. There are challenges to be overcome by both sides, the communities of practice designing crowdsourcing and citizen science projects for data/information collection and analysis and the experts behind official frameworks, if the latter intend to embrace the former, what they should, as it appears to be a consensus among interviewees that crowdsourcing (and citizen science) is/are happening and will grow despite of what governments or the UN do, as *Iacucci* and *Olafsson* state respectively:

“They⁴¹⁵ think that it's a choice, but it's increasingly not a choice anymore. So I think we're getting there not for their good willing, but we are getting there because they will have no choice anymore.” (AI: 33'55”)

“[...] citizen reporting and citizen data gathering is going to happen anyway, with or without the government.” (GO: 8'48”)

The following information outputs for quality assurance will be commented in the light of the above considerations. Some of the outputs have been given more or less focus, depending on the level of concern expressed by interviewees. The matter of “accuracy and reliability”, for instance, has shown to be of high concern of lay professional interviewees, reflecting also the literature on the topic⁴¹⁶, and therefore it will be discussed in a separated section, due to its length and complexity, given the higher relevance of the topic for crowdsourcing and citizen science.

Relevance

This matter is related to demands and priorities (from users, projects, etc.). Thus crowdsourcing and citizen science should be assessed like any scientific project regarding relevance. The case of crowdsourcing for emergency response (disasters and other humanitarian issues) should automatically fulfil this requirement due to its urgent character; other emergency issues considered as such in the long run, as those concerning environmental management and protection are too candidates for automatically fulfilling this requirement. Both cases are relevant as long as there is no successful official project based on traditional approaches on the run aiming the same purpose. But even this argument is debatable, since multiple data sets and different methods used to collect data on the same issue are useful for improving outputs on the next matter: accuracy and reliability.

414 O'Neill (2002a).

415 UN and national governments.

416 See: literature review (section 2.3).

Timeliness and Punctuality

This output is of particular sensitiveness when concerning projects based on crowdsourcing and citizen science. With respect to timeliness, that is, concerning data/information availability at the moment when the latter are needed for decision making, these collaborative approaches may show, in the case of emergency response for instance, to be the only option available and therefore, even if not “validated”, better than no information at all. From another perspective, of punctuality, the following methods presented in the ESS QAF for ensuring the latter may become a real challenge for crowdsourcing and citizen science projects.

- Publication of divergences from the pre-announced time, the reasons for divergence and a new release time.⁴¹⁷
- Divergences from the pre-announced time are published in advance, the reasons are explained, and a new release time is announced; preliminary results of acceptable aggregate accuracy can be released when considered useful.⁴¹⁸

For that these approaches, relying on the willingness of the crowd or of independent volunteer researchers, do not place the project managers in the position to make promises related to any particular calendar or punctuality. It is related to the third most mentioned issue by interviewees regarding trustworthiness and reliability of information: availability of the crowd (stability of the information source), a notorious challenge for the field, which will remain out of the scope of this thesis.

Coherence and Comparability

This matter concerns in a first step, the establishment and management of standards. Below some of the points highlighted by ESS QAF followed by comments relating to crowdsourcing and citizen science:

- Procedures and guidelines to ensure combination of outputs from complementary sources.⁴¹⁹
- Statistics are comparable over a reasonable period of time.⁴²⁰
- Statistics are compiled on the basis of common standards with respect to scope, definitions, units and classifications in the different surveys and sources.⁴²¹

It is paramount to stress that the issue of standardization in the field of data/information collection and analysis is not exclusive to crowdsourcing or citizen science. This, with particular consideration to the current scenario, where technologies have enabled the collection of greater than ever amounts and variety of data, which are widely useless due to lack of standards. This issue is highly emphasized in the IEAG report for a data revolution⁴²².

Nevertheless the fields of crowdsourcing and citizen science, as re-emerging approaches have a lot to do with respect to this matter, which as pointed out by interviewees, is possibly one of the issues hampering broader acceptance of these approaches, as it is the one of the causes for “lack of

417 European Statistical System (2011:21-28).

418 Ibid.

419 Ibid.

420 Ibid.

421 Ibid.

422 IEAG (2014).

understanding". *Witt* and *Avan* confirm the urgency for standards (structure) when asked how the approaches in question could gain acceptance and which would be the next step. *Avan* says that if it is to be useful in any way, the new approaches have to be coordinated and structured. *With time and with improved methodologies for doing that, for citizen science, people will start to accept it as the norm* (RW2: 2'40"). Here *Witt* refers to an improved system both in matters of a solid validation system (to be discussed in the next section on accuracy and reliability) and of a coordinated, structured system as pointed out by *Avan*. The need for being coordinated demands a common structure, a standard (or standards) in the first place. Many features need to be established for the fulfilment of this demand, most clearly is the urgency of regulatory policies⁴²³ at organizational level (on privacy, security, ownership, access, transparency, quality assurance, etc.), followed by a comprehensible terminology and guidelines for project design⁴²⁴. Moreover, according to ESS QAF, after the establishment of standards, projects need to be regularly assessed to make sure that those have been met.

Standards are relevant from enabling comparability and consequently to assess coherence and divergence between different sources concerning the same or similar information on same domain/phenomenon⁴²⁵. In case divergences between the data are identified ESS QAF emphasizes the need for publicly explaining such divergences as well as reconciling them when possible, as one may see below:

- Identification and explanation of divergences. Divergences originating from different sources are identified and reasons clearly and publicly explained.⁴²⁶
- Reconciliation of statistical outputs. Statistical outputs are reconciled whenever possible.⁴²⁷

This approach relates to the need of communicating uncertainty and to the verification method of triangulation, both are to be discussed in the next section. The presence of such statements in an official framework is very positive considering that it is characterized as a "pro transparency" and pro "embracing uncertainty through its communication" official positioning, however the same question of whether or not it has been properly applied remains.

Accessibility and Clarity

Here too, crowdsourcing and citizen science communities have a great deal of procedures from ESS QAF's approach to take as model for an own quality assurance framework. The way information is displayed and delivered is cardinal.

Particularly in crowdsourcing and citizen science approaches, where the public is a central key (as user and producer of information, also called "produser"), it is essential that the users' opinions are taken into consideration when concerning the planning of how information will be disclosed, as ESS QAF determines:

423 *Olafsson* believes that the UN should make front in bringing up discussions on policy-making for these approaches.

424 There are some effort from the involved communities concerning this urge. Nevertheless, it seems still that each one is producing their own models, standards and typologies. See section 3.2.1.

425 European Statistical System (2011:21-28).

426 *Ibid.*

427 *Ibid.*

- A dissemination policy, defining dissemination practices, is in place and is made public. Procedures are in place to review the standards for the dissemination of statistical results.⁴²⁸
- Consultations of users about dissemination. Users are consulted about the most appropriate forms of dissemination (e.g. Focus groups, Customer Satisfaction Surveys) on a regular basis.⁴²⁹

Due to information sensitiveness, where privacy and security issues apply, crowdsourced and citizen science data cannot be always regarded as “open data”. However, whenever it is possible, when data is not considered to be sensitive, information resulting from these approaches should be fully transparent, for the same reason as advocated above: the public is central for the project. A mutual relation of trust between the organization behind the project and the volunteers may show to be difficult if the public has no access to the raw data and metadata.

Thus users should know what kind of information they are consuming as well as its quality. As it was already mentioned in this thesis⁴³⁰, the communication of uncertainty (and risk) is crucial for restoring trust and making sure that the concerns of all stakeholders are taken into consideration in the decision making processes. It seems like the ESS QAF is in alignment with these notions, at least in the text, where the following statements are identified: *quality report will be made available to the user; data will be compared and made publicly available; in case of divergences, those will be explained and publicly available*⁴³¹. Whether or not an “open quality report” also implies “communication of uncertainty” is another issue

To conclude this section it is important to highlight the role of metadata in the final product: the inclusion of relevant metadata in the latter may grant the user with the possibility of verifying information him/herself. ESS QAF covers this essential aspect as presented below:

- A policy for archiving statistics and metadata is in place.⁴³²
- Metadata are documented according to standardized metadata systems.⁴³³
- All statistical results are disseminated together with the respective metadata allowing for a better understanding of the results.⁴³⁴
- Metadata are available and, if separate to the statistical product clear links are presented.⁴³⁵

5.2.2 Dealing with “The Main Challenge”: accuracy and reliability

Although this matter is held as the most critical regarding crowdsourcing and citizen science by non-expert interviewees, expert interviewees recognize that this is indeed an issue of concern, yet not exclusive to crowdsourcing and citizen science approaches, as it was remarked previously with respect to uncertainty⁴³⁶. Hence as *Verity* advocates, the issue of validation in crowdsourcing and citizen science claimed by many organizations, refers partially to nothing other than prejudice.

428 Ibid.

429 Ibid.

430 See: section 3.3.

431 Quality Assurance Framework of the European Statistical System (2011:21-28).

432 Ibid.

433 Ibid.

434 Ibid.

435 Ibid.

436 With concern to Ravetz & Funtowicz' notion of post-normal science. See: section 3.5.

In fact, according to *Olafsson* data from crowdsourcing is often more accurate than actually going out doing field assessment.

“I don’t trust’ [...] It is an easy thing to say, to remain ignorant about it.” (AV: 41’41”)

The lack of trust and the problem of prejudice are in turn, more likely to be solved with time and greater understanding of concepts and processes, issues to be addressed in the next section. Notwithstanding the matter of accuracy and reliability⁴³⁷ will be critically approached, as it takes the ESS QAF as a base-line for further considerations and suggestions to be discussed in the next paragraphs.

Comparison of Results with Other Sources

“Results are compared with other existing sources of information in order to ensure validity.”⁴³⁸

“Once a proposition has been confirmed by two or more independent measurement processes, the uncertainty of its interpretation is greatly reduced. The most persuasive evidence comes through a triangulation of measurement processes.”⁴³⁹

To compare an information or data set with alternative sets coming from other sources regarding the same issue is a natural process of validation and it is technically referred to as a validation method named “triangulation”. According to Denzin⁴⁴⁰ there are different types of triangulation: data-, investigator-, theoretical-, and methodological triangulation, being data and methodological of our main concern. The first entails gathering data through several sampling strategies, so that slices of data at different times and social situations, as well as on a variety of people, are gathered and the second refers to the use of more than one method for gathering data.⁴⁴¹

In its theoretical core, the term “redundancy”, broadly used in the context of validation in large scale citizen [crowd] science projects (e.g. Galaxy Zoo⁴⁴²), does not significantly differ from the conception of “data triangulation” presented above, since it is also based on the assumption that equal information coming from unrelated sources characterize reduction of uncertainty on that particular information.

However a validation approach based on redundancy deals mostly with filtering individual information entries. Those entries that are repeated an x number of times will be exempted from posterior review, and those which display contradictory entries referring to the same issue or those which have not got enough entries will be automatically flagged for expert review.

437 Issues of main concern of most of the non-expert interviewees.

438 European Statistical System (2011:21-28).

439 Webb et al. (1966).

440 Denzin (1970).

441 Ibid.

442 See: [<http://www.galaxyzoo.org>].

Thereby the redundancy concept may be kept for a first level of validation, closer to individual entries whereas triangulation may be employed for a final level of validation concerning different sources and/or methods of final data-sets.

Dealing with the proposition that there would be more acceptance towards the field of crowdsourcing and citizen science on the occasion that a proper automated validation infrastructure based on algorithms becomes fully functional, *Meier* comes up with the following observations regarding triangulation:

“[...] I think that we will go along with because what we need is some kind of a consistent measurement about certainty. And I think that is important to have. And I think once we have that, there will be greater acceptance. But it is not going to completely overcome it at all. I don't think that it's going to be silver bullet in any way. It is not going to be magic at all. At the end of the day what needs to continue happening is that you take multiple sources of information [...] not just ten tweets or texts messages, but you take all available information across all available media and you triangulate between television, radio, SMS, Tweeter, Facebook, formal humanitarian reporting and the data humanitarian professionals are generating and so on... it is all about cross-triangulation in a far more macro-level than doing automated verification within one particular media.” (PM: 21'14")

“I think it will always be about trying to triangulate the information. If ten people report a train crash on social media, ok, let's call the train station to find out. If you can do more verification, people will try to do the verification.” (PM: 22'52")

Nevertheless triangulation on the final level of the validation process may often disclose contradictions. On the contrary of what is generally believed, the contradiction will not invariably point out bad data quality from the crowdsourcing project, but it may equally point out inaccuracy of other sources. Once it may become problematic to conceal all the sources, *Verity*, *Meier*, and *Olafsson* insist on the conception of “augmented products”, defined as a combination of all available data sets (from different sources and methods) regarding the same issue, presented in form of layers of an unified final product.

Although it can be debated whether or not more information leads to better information, as it is the argument of the three mentioned interviewees, augmented products are likely the best way not for displaying what “it is”, but what we know about what “it may be”, pointing out where we should investigate, as *Levine* remarks, it is a great tool for visualizing trends. Once more, the subject of embracing uncertainty as advocated by Ravetz and Funtowicz (among others) emerges as a necessary paradigm shift in opposition to false certainties and truths.⁴⁴³

443 See theoretical framework (section 3.5).

Following the suggestion of Ravetz⁴⁴⁴ I have come across the Guide for Uncertainty Communication to the Guidance for Uncertainty Assessment and Communication published by PBL Netherlands Environmental Assessment Agency.^{445,446} This report on how to communicate uncertainty proves to be a step ahead of most of the organizations we have been dealing with until now, once it does not merely bring the conception of uncertainty and data/information quality communication to the centre of discussion, but it shows how it should work.

Figure 5 (below), from the Guide for Uncertainty Communication, shows a possible way to communicate uncertainty related to spatial data through overlaying informative maps, or “augmented products”. This mode of uncertainty communication is particularly relevant for crowdsourcing and citizen science approaches for environmental monitoring as well as for disaster management, due to the high level of spatial information these fields usually deal with.

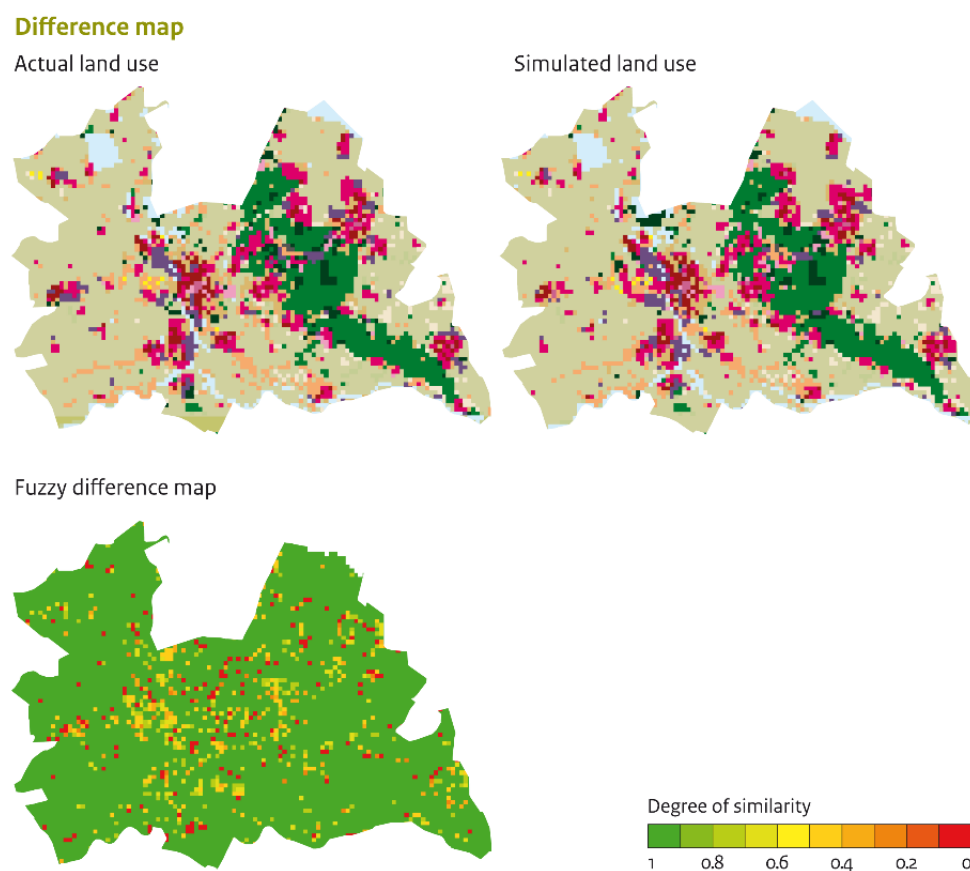


Figure 5: Presenting Uncertainty in Graphs

⁴⁴⁴ In personal conversation.

⁴⁴⁵ Petersen et al. (2013).

⁴⁴⁶ The guidance has been developed as part of a strategic research project on uncertainty analysis, transparency and communication.

The figure above regards land use and provides a “difference map” indicating uncertainty by overlaying the two different maps, one concerning a simulation of land use and the other the actual land use.

When the two maps are overlayed, algorithms will generate a third map (difference map) highlighting the areas (pixels) which match 100%, those which do not match at all and those matching partially. The difference map can be interpreted by taking account the colours representing different degrees of similarities (as displayed in the bar on the lower right corner).

The difference map may be generated by the overlay of two or more maps, which do not need necessarily to regard a simulation and an actual use, but which could for instance represent different results from different data collection methodologies (e.g. through crowdsourcing and through professionals on the ground).

It is significant to mention that augmented products will not always show divergent information, pointing out the gaps and uncertainties. It will also show matching of data-sets, meaning less uncertainty and more data accuracy. Thus, in general, the purpose of augmented products is not solely to communicate uncertainty but above all to promote transparency.

Moving forward, for a first level validation, the redundancy approach is already the main tool in use today in the context of crowdsourcing data and citizen [crowd] science projects; however, it is very often difficult to achieve the necessary number of entries for validation via redundancy. This happens especially in the case of medium scale projects which are neither in the position of gathering a very high number of entries, necessary for automated validation through redundancy algorithms, nor in the position to provide an expert for reviewing the contribution of all volunteers (possible in small projects). Besides the case of medium scale projects, the above mentioned complication also highlights the issue of availability of the crowd or stability of the information source in crowdsourcing and citizen science contexts, as discussed in the last section regarding timeliness and punctuality.

As an alternative for eliminating steps of verification in a first level, such as redundancy, what would be especially useful when concerning the case above, *Meier*, *Verity* and *Helbing*⁴⁴⁷, have all suggested the implementation of a system of reputation.

“[...] so instead of two levels of verification, or three levels, we will do one less, because we believe that this will already be coming from a semi-verified kind of person.” (AV: 01h04'26")

This system could be community based as *Verity*, similar to *Meier*, proposes:

“Identifying these sorts of trusted networks within a country and being able to leverage that entity or that network; making use of that semi-trusted individuals in the country, driving people accept data with less verification.” (AV: 01h04'47")

447 Also an interviewee.

Or based on feedback loops, where a volunteer providing solid contribution to the project, that is, maintaining quality (assessed via expert and/or peer review and/or via redundancy) and regularity, also regarding contributions to discussions in forums for instance, would become a top-contributor, a “trustworthy person”.

A trustworthy person's (acknowledged and endorsed by the reputation system or community) contribution would have the same weight of information provided by a “to be established” number of newcomers, depending on their levels of reputation (credibility). This strategy would reduce the number of entries necessary for automated validation via redundancy. A “very trustworthy” person's contribution could be weighted and even dismiss the redundancy step as it is the case of professionals submitted to hierarchical structures. In this case, however, accountability would be a resultant of trust based on credibility and reputation rather than from threat of punishment.⁴⁴⁸

“I think that legitimacy and credibility can evolve over time, in a number of different ways. The community does not exist as an island. Members of that community already trust that community and they are part of other communities. And that transfer of communication, of credibility, can happen over time. A good analogy that I would use from the past, is with blogs. Back in 2001, 2002 people were freaking out: ‘How can we trust blogs? Anybody could write anything.’ People have proved to be completely wrong, because we have seen blogs gaining reputation, gaining credibility and even increasingly now, as a common established practice, blogs are sided by the main stream media, are sided by organizations and companies.” (PM: 28'59”)

This idea has been advocated already in 2010 by Alabri & Hunter, who have described a *technological framework that combines data quality improvements and trust metrics to enhance the reliability of citizen science data*:

“We describe how trust models provide a simple and effective mechanism for measuring the reliability of community-generated data. We also describe filtering services that remove untrustworthy data, and enable confident re-use of the data.”⁴⁴⁹

Moreover *Helbing* also believes that in order to improve the quality of contributions, a reward system (data-money⁴⁵⁰, badges...) could be helpful. This approach has the potential to enhance the level of attention of the volunteer, tending to improve quality. However extrinsic motivational triggers (those in question) are believed to lose their effectiveness over a certain period of time in opposition to intrinsic motivational triggers (passion, curiosity, altruism, etc.). Furthermore this kind of approach would probably be inappropriate in cases of emergency response for instance, where volunteers tend to contribute based on intrinsic motivations anyway.

448 Notions discussed in the theoretical framework (section 3.3).

449 Alabri & Hunter (2010).

450 A form of digital currency which can be exchange only in the cyberspace.

In the Citizen Cyberscience Summit in London, a central meeting point of the whole community involved with citizen science, whenever the discussion about financial rewards (if data-money fits this conception is another discussion) took place, it was immediately refuted; by contrast, other kinds of rewards such as “digital badges”⁴⁵¹, have shown to be welcomed by the community. *A badge is a symbol or indicator of an accomplishment, skill, quality or interest. It is used to recognize the abilities of an individual on various fronts*⁴⁵². A badge can be physical (as those boy scouts have been using for long) or digital. Digital badges (also called virtual badges) are online records of achievements (usually through online courses, trainings, tasks or games).

Last but not least, there is another method for validating crowdsourcig data/information. It concerns the use of more than one layer of crowdsourcing, by engaging a “bounded crowd”⁴⁵³ in verifying data/information produced by an “unbounded crowd”. An example from this practice is the platform “Micromappers”⁴⁵⁴ which relies on a so called “stand by task force” for analysing and classifying crowdsourced data/information in addition to the machine-based classification.

Quality Reporting on Accuracy

“Periodic quality reporting on accuracy is in place (serving both producer and user perspectives). Quality reporting on accuracy is guided by ESS-recommendations.”⁴⁵⁵

The presence of quality reporting, as stated above, in an official framework is itself a very positive aspect, as discussed in previous sections. Notwithstanding, it may become irrelevant as preceding assessment outputs filter out all data which have not been classified with over 90 % accuracy or reliability. Further research on the functionality of the quality assurance processes within regulatory institutions is needed if this scenario is to be proved or refuted. In the case it is proved, it is paramount that a very seminal shift takes place: alternative data/information collection methods such as those relying on volunteers, regardless of levels of reliability and accuracy should be considered as *acceptable* information/data sources. For making this inclusion reasonable, uncertainty communication (also relying on augmented products) should be included as a matter in official frameworks, in order to be more inclusive regarding the methods above as well as to be more critic regarding traditional methods. The inclusion of this matter (uncertainty communication) would not exclude all others, once they are complementary.

451 Especially Mozilla's Open Badges: [<http://www.openbadges.org>].

452 Open Badges Working Paper: [https://wiki.mozilla.org/images/b/b1/OpenBadges-Working-Paper_092011.pdf]

453 A bounded crowd may concern a pool of expert or a pool of very engaged volunteers which are held in stand by and mobilized upon request in case of emergency form instance. See section 4.1.1 (chapter four) for more details on these definitions.

454 See: [<https://micromappers.wordpress.com>].

455 European Statistical System (2011:21-28).

5.2.3 Little Understanding, Lack of Awareness and Prejudice

As already mentioned, the issue of “little understanding” has been labeled by interviewees as the second main issue (after data/information reliability and quality) of crowdsourcing and citizen science. In fact, expert interviewees have considered it to be the main issue, being expressed as a form of prejudice as *Olafsson* asserts: [...] *there is a lot of lack of understanding and awareness of what it can be used for, there is also resistance of doing new things in general.* (GO: 12'02") In agreement with *Olafsson* and *Verity*, *Avan* states that there is a lack of awareness and understanding of a huge part of the IOs and governments personal with respect to these approaches.

Indeed, I agree with the proposition holding “little understanding” as the main driver of prejudice, however it is paramount to highlight that in the context of crowdsourcing and citizen science, the issue of little understanding, and also lack of awareness (or ignorance), which according to expert interviewees leads to prejudice is complex and multifarious. Three aspects stand out in different levels of abstraction, from pragmatic conceptions to deep-rooted ignorance (default).

The first, which *Olafsson* has called a matter of managing the expectations of collecting useful data and how to interpret and to make sense of it; concerns a pragmatic point of view, advocated by some of the expert interviewees⁴⁵⁶. It refers to ignorance in relation to the method *per se*, its processes and applications (explained throughout this work). *Olafsson* argues that they need to understand how having multiple sets of information, instead of only one, will be more likely to be accurate, following the same line of thought expressed by *Verity*:

“I don't trust' [...] It is an easy thing to say, to remain ignorant about it. But if they get involved and find out the steps that we take to get the data, how do we verify it [...]” (AV: 41'41")

This line of thinking is coherent with two facts: one, that data/information quality, as explained in the previous section, is not an exclusive issue of the approaches in question, but a common concern regarding any innovative tool or methodology, which tend to be solved through raised awareness (capacity building and sharing of best practices) over time⁴⁵⁷; and two, that quality assurance procedures are, as in the case of other data/information sources, applicable to data/information resulting from crowdsourcing and citizen science alike. Hence both of these realizations lead to the conclusion that the disproportional concern with data/information quality in crowdsourcing and citizen science, when compared with other approaches for data/information collection analysis, turns out to be an expression of prejudice.

Such consideration, combing the above mentioned aspect of little understanding with concerns on data/information quality and reliability, may be held as the **pragmatic *raison d'être*** of the inquired phenomenon; thus, just part of the whole explanation, as there IS utility in understanding beyond pragmatism. In this manner, other aspects of little understanding (conceptual

⁴⁵⁶ It is not possible to determine whether by convention or opinion.

⁴⁵⁷ It is subjected as *Verity* reminds us, to the same “technology adoption lifecycle” that other new technologies go through.

misunderstanding or unawareness and deep-rooted ignorance) appertain to higher levels of abstraction, do also play a major role, actually, as it will be clarified in chapter six, “the major role” in shaping prejudice towards crowdsourcing and citizen science, ultimately hindering the realization of a data revolution and of latent paradigm shifts.

From this perspective, what the majority of interviewees have disregarded may turn out to be the primary forms of prejudice underlying in turn more definite prejudices, such as the one pointed out by expert interviewees, regarding the relationship between little understanding and technology adoption lifecycle. The following paragraphs concern these primary forms of prejudice.

Iacucci goes a bit further than other interviewees (beyond pure pragmatism) by emphasizing, as a second aspect of “little understanding”, the lack of conceptual understanding or misunderstanding regarding the term collaboration as the main characteristic of the approaches in question; that, even within discourses on collaborative approaches (collaborative research; collaborative thinking). As we have seen in chapters three and four, collaboration, in opposition to cooperation, refers to the act of working together aiming a common goal. This understanding is fundamental for shaping judgements towards the reliability of “the crowd” or of “non-professionals” as data/information sources, as it implies a relationship of mutual trust⁴⁵⁸, strengthened by the common goal element; relationship which, has lost its place in the currently ruling paradigm, where [modern] accountability⁴⁵⁹ is the maxim. Hence by belonging to a logical set of an alternate paradigm, the comprehension of such relationship and conception by the *homo economicus*⁴⁶⁰ is hindered. At this point the second and third aspects of little understanding overlap as one realizes that prejudice in the context of crowdsourcing and citizen science goes beyond pragmatic unawareness, being held as a deep-rooted form of ignorance with regards to phenomenology and construction of social reality takes place. In this case, the term little understanding is indeed not appropriate, instead lack of awareness is most suitable.

The unawareness of what drives one's own behaviour and of what governs those otherwise perceived as “given” social structures, leads to a form of prejudice, which by being grounded on pragmatic assumptions, shows to be the most challenging to combat. This is the scenario that one is likely to encounter if one tries to convince another individual, working within hierarchical structures of accountability, that he/she should simply *trust* “the crowd” or “non-professionals”. He/she will immediately get a warning in his/her head asking: “And who will be accountable in case anything goes wrong?” The answer: “You, you, you!” How to argue in this situation? *Do not*. These considerations may be held as an overture to the final hypothesis, to be developed in the next chapter.

458 See theoretical framework (section 3.3) for an explanation of the terms.

459 Ibid.

460 “A theoretical human being who rationally calculates the costs and benefits of every action before making a decision, used as the basis for a number of economic theories and models.” - Collins Dictionary [<http://www.collinsdictionary.com/dictionary/english/homo-economicus>]; Alternatively: “Using rational assessments, Homo economicus attempts to maximize utility as consumer and economic profit as a producer.” - Oxford Online Dictionary [<http://www.oxforddictionaries.com/definition/english/Homo-economicus>].

6 Hypothesis Formulation: the underlying role of accountability and trust

Hypotheses' development has taken place throughout the last chapters. Notwithstanding, in order to clearly outline the rationale behind the final hypotheses, the present chapter will once more, bring (concisely) the main insights and considerations into awareness, while disclosing hidden connections between one another.

It is paramount to note that most of the concepts to be addressed in this chapter are highly depending on theoretical understanding provided in chapter three. Therefore, those terms which were introduced in chapter three will refer back to the page where its explanation can be found.

“It is difficult - no, impossible is better way to put it - to ignore accountability when it is cited as both the cause and cure for every ailment and imperfection in government and among those who govern (whether in public, private, or ‘third sector’ contexts).”⁴⁶¹

And it is in turn, impossible to talk about accountability without referring back to its roots, to morality, to trust relations, to organizational theories and bureaucratic structures (based on vertical hierarchies, risk transfer and aversion).

As we have learned in chapter three, all accountability⁴⁶² relations, be them resultants of positive sentiments⁴⁶³ (trust) or of negative sentiments⁴⁶⁴ (invasion of private spheres) will ultimately concern human's most basic instinct: of survival, self-preservation; being directly linked with safety. The notion of safety regards two other central terms for this thesis: risk and uncertainty, as it is defined by the lack or low probability of the latter. It is possible to conjecture that morality, based in turn, on notions underlying the terms “trust and accountability”⁴⁶⁵ (also collaboration, cooperation, compassion, fairness and empathy) is a natural⁴⁶⁶ set of rules aiming the welfare of the “collective”, as the latter will in turn provide a “safer” environment for the individual.

Modern times have witnessed a scale up of this system, where individual inclinations towards self-preservation and morality have been replicated in a macro scale, the one of institutions and organizations, which today, behave as unities, as one single body/organism with regards to relations of accountability and trust.

Hierarchical structures have been part of this system since a very long time. Bureaucracy may in turn, be considered as an attempt to “optimize such a system” by introducing regulatory and

461 Dubnick (2011:707).

462 It is important to highlight that accountability may not be the most appropriate term in this context after all, as the latter is considered to be a modern term, closer to meaning of “render account” (from calculation) than to the resultant of trust or of invasion of private sphere. This matter is explained in detail in p. 33 (section 3.3).

463 Section 3.3 (p.34).

464 Ibid.

465 And their multiple interpretations, as explained in section 3.3.

466 Whether or not morality can be considered an innate trait, is a highly polemic topic. I recommend the following TED talk to be considered as one argument for the “innate” hypothesis: De Waal (2012): [\[https://www.ted.com/talks/frans_de_waal_do_animals_have_morals/transcript\]](https://www.ted.com/talks/frans_de_waal_do_animals_have_morals/transcript).

control mechanisms intended not only to reduce uncertainty and diminish risk by making individuals' and organizations' behaviour more predictable, but also to improve performance and consequently to enhance effectiveness. Science is itself a bureaucratic system and quality assurance frameworks, contracts and other accountability mechanisms' end goal is to diminish risk and uncertainty.

But risk for whom? The issue here is the shift from what may today be considered as "a risk" within organizations, and also a risk "for whom". Today a risk for a professional is to lose his/her job (source of income) or credibility/reputation (assurance of future income). And a risk for an organization is too, to lose credibility and reputation and thereby partners, clients, investors or donors. Thus as we have seen in chapter three⁴⁶⁷, risk is today solely quantified in economic terms. "How much will it cost if we get it wrong?" This paradigm, by lacking purposefulness has another cost though, and it is humanity⁴⁶⁸. It could eventually be considered amoral (not concerned with right or wrong), and in this case, how could one judge if data/information is good or bad if one can no longer differ from right and wrong?

Moreover there is negativity bias⁴⁶⁹, a social phenomenon which make individuals, and organizations even more risk averse as the fear of punishment is usually greater than the hope for success, possibly a consequence of another phenomenon where the judgement for failures, by observers, is usually harsher than the appraisal for successes.

Hence the notion of accountability (a term with a high level of sinonimity) in the context of this thesis is multifarious⁴⁷⁰ and entails: [modern] accountability⁴⁷¹ linked to the conceptions of risk transfer and risk avoidance (also blame avoidance, ultimately fear of punishment); trust and its resultant (a form of what we understand today as "accountability"); and also transparency as it is advocated in the public discourse.

6.1 Take Away from Interviews' Analysis

Moving forward, in contrast to the second, the first interview question has incited (through the open question "why") answers loaded with subjectivity and relevant insights, such as the issue of [modern] accountability, which has triggered the quest for challenges beyond pragmatism. Not just interviewees have expressed concerns with accountability through their discourse⁴⁷², but the issue has emerged throughout data analysis as well, as between the three determinants identified in section 5.1 (scope, size and age) and organizations' behaviour towards novel approaches, rests [modern] accountability. That is, it is the level and quality of accountability, influenced by the three determinants that will define organizations' behaviour and not the instances of scope, size and age alone.

⁴⁶⁷ Section 3.2.3.

⁴⁶⁸ Not the "end beneficiary" as the latter may be more than often, those on the top of hierarchies.

⁴⁶⁹ Section 3.2.2.

⁴⁷⁰ See theoretical framework for a detailed explanation of each of the following concepts (section 3.3).

⁴⁷¹ Definition section 3.3 (p.34).

⁴⁷² Mostly rooted on fear of blame (and punishment) and related with multilateral agreements (contracts), potential economic cost and potential loss of credibility and reputation.

The second interview question has in the one hand, confirmed the widespread concern with data/information quality, as expected, highly impacting the literature produced on the topic, which as we have seen, focuses on data/information quality *per se* or on related issues⁴⁷³ such as typologies, standards and best practices concerning the latter or the topic of how to motivate and keep volunteers motivated⁴⁷⁴.

And in the other hand, it has brought up the issue of “little understanding” and consequently “prejudice”, which although approached by expert interviewees⁴⁷⁵ in a rather pragmatic way, disclosing a more general issue with regards to the relation between awareness and time in the context of lifecycle of technology adoption, it has also lead to insights concerning other aspects of unawareness such as those related to latent paradigm shifts and hidden social structures (with respect to accountability), being closely related to deep-rooted prejudice derived from ignorance. In a sense, it is possible to state that one of the aspects of lack of understanding (latter) regards the scenario elucidated by the first interview question, where accountability is key.

6.2 Knowledge and Power: the meaning of data quality

It turns out, as discussed, that the challenges of crowdsourcing and citizen science based on pragmatic assumptions, that is, data/information quality and reliability, as well as little understanding *vis-à-vis* novel approaches and technologies are not issues restricted to these collaborative approaches.

The above statement may seem to disregard the importance of data/information quality; this is not the case though. In order to better understand and to tackle the data/information quality issue, it is paramount to address the underlying meaning and purpose of the latter.

For a grounded understanding of the upcoming arguments, it is interesting to consider the meaning of the term quality: *how good or bad something is*⁴⁷⁶ or *the standard of something as measured against other things of a similar kind*⁴⁷⁷. Since the attributes “good” and “bad” are extremely subjective and *per se* always relative, it is more elucidating to think about quality informed by the second definition. Taken this into consideration, it is nothing other than reasonable to state that quality is enhanced through comparison, cross-referencing, or triangulation⁴⁷⁸.

Based on this assumption, one could infer that science is a self-contained knowledge system, which provides sets of standards to serve as benchmarks for emerging data to be measured against, what is indeed an useful asset (if an ideal scenario free of values is assumed). In the case of lack of standards (as in cutting edge research fields), the data quality will be measured through “replicability”, that is, with itself over time (this is how knowledge is ideally produced in science). Hence any kind of data, which can be regularly collected, may acquire, over time, the label of “good quality” as it becomes comparable to itself.

473 As explained in the literature review (section 2.3).

474 Aiming the stability of data/information source (availability of the crowd), as discussed.

475 Except *Iacucci*, as mentioned in the previous chapter.

476 Cambridge Dictionaries Online: [<http://dictionary.cambridge.org/dictionary/british/quality>].

477 Oxford Online Dictionary: [<http://www.oxforddictionaries.com/definition/english/quality>].

478 In alignment with explanations provided in chapter 5 (section 5.2.2).

Science as a reliable set of standards may be useful, as mentioned; however, to define scientific standards (or any other) as the only genuine benchmark, is to judge one set of standards to be “better” than another. And that is where power lies on, on these closed hierarchical bureaucratic structures, producers of truths.

Back to the challenges of crowdsourcing and citizen science, the matter of quality and reliability is indeed a general issue, especially concerning those more and more common scenarios of ever increasing complexity where decision-making is carried out facing conditions full of uncertainties (regarding data/information) and loaded with judgemental values, coming from multiple perspectives (of stakeholders).

The scenario described above does also characterize a paradigm shift, as discussed in chapter three⁴⁷⁹, regarding Ravetz and Funtowicz’ notions of post-normal science. Post-normal science, as other latent paradigm shifts will enormously benefit from a data revolution which shall allow improved comparison (triangulation) between different data/information sources (including crowdsourcing and citizen science) for producing better, augmented information and transparency, in this case regarding uncertainty communication which will lead to policy and decision making based on informed consent⁴⁸⁰.

Hence in post-normal science the very meaning of quality with regards to data is disrupted, as it shifts from within hierarchical structures of power to extended peer review networks, which will include non-professional actors as valid sources of data/information and which are to be taken into consideration on quality reporting processes, fostering in turn the emergence of those subjugated knowledges⁴⁸¹.

Thus based on the above explanation, it is paramount to emphasize that I do not deny data/information quality and little understanding with concerns to novel approaches as real issues of crowdsourcing and citizen science, or in fact, as explained above, of traditional data sources too. [Modern] accountability mechanisms have been created for improving performance⁴⁸², thus quality of outputs shall not be disregarded as after all, there is a need for order in our complex world. I argue that these issues are to be tackled in parallel to other issues of higher level of abstractions, which in the case of the approaches in question, will show to be crucial for unlocking the realization of data revolution and subsequently of other latent paradigm shifts based on mutual trust and on the empowerment of the people (through the rise of subjugated knowledges).

479 Theoretical framework (section 3.5).

480 Informed consent is a concept borrowed from bioethics (O’Neill: 2001; 2002b), but which fits elegantly in the discourse on participatory policy and decision making, uncertainty communication and mutual trust.

481 Foucault (1980) in section 3.4 (theoretical framework).

482 A question which remains open is whether hierarchical oversight improves performance. It is said that the mere presence of an observer is enough to change behaviour, that already in the particle level. It is also said that it is the attention we pay to things that shape reality around us (McGilchrist: 2009). If we consider that due to accountability to one or more observers, we social beings, for fear of punishment (also moral) through negative judgement (e.g. blame), pay more attention to our actions, it could be said ultimately that accountability improves performance. That is probably the principle of Weber’s bureaucracy theory, claimed to be the most effective system for managing complexity, but the same principle may well serve non hierarchical structures of oversight as well, this is a point for further discussion.

6.3 Beyond Pragmatism

“This pragmatic liberalism, which I shall here distinguish from the ideal liberalism, was vastly preoccupied with the machinery of life. It was characteristic of this creed to size the part played by political and mechanical invention, by abstract thought and practical contrivance. And, accordingly, it minimized the role of instinct, tradition, history; it was unaware of the dark forces of the unconscious; it was suspicious of either the capricious or the incalculable, for the only universe it could rule was a measured one, and the only type of human character it could understand was the utilitarian one.”⁴⁸³

From an alternate perspective, after careful analysis and considerations, it is possible to conclude that even those pragmatic assumptions, concerning data/information quality and the prejudice towards any emergent technology⁴⁸⁴ or innovative approach, are too grounded on accountability relations.

The cycle of technology adoption for instance, as any other cycle is determined by time. Time is needed for spreading awareness indeed, endorsing the pragmatic aspect of “little understanding” with respect to the method *per se*, its procedures and applications. Nevertheless the time needed for novel approaches (in general) to be adopted is not solely related to such awareness, but also to relations of accountability, based on inclination to risk and fear of blame and punishment. In other words, over time, bold individuals (reflecting on organizations) will dare to try novel approaches, while others “sit and watch”. A serie of successful applications of a given technology or method, will, based on the “scientific notion of replicability”, be validated, again, over time, as the number of adopters increases. At some point, the number of adopters will be enough for those risk averse individuals and organizations to consider the adoption to be a “safe move”, as after all, there is safety in numbers⁴⁸⁵; as we have discussed in chapter three⁴⁸⁶, sticking to the group (as well as referring back to manuals and protocols) is an efficient form for deflecting accountability.

Furthermore the concern with data/information quality and reliability may too, be considered as an expression of fear of punishment in case “things go wrong”⁴⁸⁷. Also the systems which ensure such indicators of quality and reliability today, such as professional hierarchies, quality assurance frameworks, manuals, protocols and standards, are based on accountability relations, pervaded by risk transfer techniques⁴⁸⁸.

Enlightened by the above considerations, the pragmatic approach may be considered an oversimplification of what one may understand as our shared social reality. Notwithstanding even by acknowledging the fundamental role of theoretical assumptions underlying pragmatic stands,

483 Mumford (1940).

484 As they are all subjected to the technology adoption cycle.

485 “Proverb. ‘Being in a group of people makes you feel more confident or secure about taking action’.” - Oxford Dictionaries [<http://www.oxforddictionaries.com/definition/english/safety>].

486 Section 3.2.3.

487 This concern was expressed by *Avan* and *Levine* in interview, regarding potential economic costs, and reputation and credibility, respectively.

488 As discussed in section 3.2.3.

policy and decision making are still carried out based on evidences founded on the latter. Therefore, a pragmatic explanation justifying the need to go beyond pragmatism in the context of latent paradigm shifts will be provided in the following paragraphs.

As it was noticed in the first stages of interviews' analysis, the two pragmatic issues named by interviewees: data/information quality and reliability; and prejudice resulting from little understanding with concerns to the method *per se*⁴⁸⁹, its procedures and applications; have very clear "solutions", depending solely on time (unfortunately indefinite) to be consolidated. These are respectively: the establishment of standards (measurable outputs, quality assurance framework and best practices)⁴⁹⁰ in order to enhance comparability, thus improved validation systems, and to invest on technological innovations for optimizing validation procedures and/or for serving as a new source of data collection and analysis to be compared with others; and to focus on capacity building and knowledge dissemination for the purpose of raising awareness.

However, as one may see, these are indeed very typical challenges and widespread solutions for any innovative approach. "It is just a matter of time". But do we have this time? Do those people who would must benefit from the approaches in question deserve to wait indefinitely for the professionals to decide that it is a "safe move"?⁴⁹¹ Furthermore, due to the underlying foundations (mutual trust) of crowdsourcing and citizen science, which are placed outside of accountability structures, would the regular procedure characteristic of technology adoption cycles be enough, or even suitable in a first place for overcoming reluctance from the part of organizations to embrace it? These are questions which must be addressed and which I will attempt to answer in form of hypothesis throughout this chapter.

In order to illustrate some of the pragmatic challenges mentioned above (particularly with concerns to data/information reliability and quality), one may look at a 2010 web article named "4 Real Challenges to Crowdsourcing for Social Good"⁴⁹², showing concern with (1) availability of the crowd by asking "Will the Crowd Care?", what leads to the conclusion that efforts must be made not just to engage the crowd again and again but to keep them engaged for longer periods of time through the employment of the right motivational incentives; (2) time – to plan, design and carry an optimal crowdsourcing project, focusing on engaging the highest possible number of contributors with the lowest possible margin for error, will cost a lot of time; (3) structure and (4) enforcing rules. The last two as well as the first are part of the process requiring so much time. Second and third aim to keep order, thus to have the control over the quality of the data/information output coming from the crowd.

All the four challenges considered together may give one the impression that crowdsourcing for social good (also environmental) is hard as it costs a lot of money and time (based on pragmatic assumptions). The problem with this judgement towards crowdsourcing (and other collaborative approaches alike), also reflecting academic efforts on this topic⁴⁹³, is exactly that where

489 Behind crowdsourcing and citizen science.

490 Also through policy making.

491 Consider that nowadays risk is widely measured based on financial terms.

492 [<http://mashable.com/2010/10/12/social-good-crowdsourcing>].

493 As previously exemplified.

there is not much of time and/or money, is where the contribution of the crowd is mostly needed (e.g. emergency response, remote and poor areas).

As we have seen expert interviewees (*Meier, Verity, Olafsson*) have stressed over and over again the “complementary character” of data/information coming from the crowd/volunteers, referring to such data sets as “additional layers of information”. Their points of view have led to the inquiry disclosed in chapter five⁴⁹⁴ regarding validation methods such as triangulation (also cross-referencing) and to theories such as distributed cognition⁴⁹⁵, as the latter, formulated by Hutchins, advocates that “distributed cognition” may be enhanced through the confrontation of diverging information, inferring that “more data” may resemble “better data” after all⁴⁹⁶. Hence in an ideal scenario, as clarified in the last section, multiple data/information sets deriving from a variety of sources⁴⁹⁷ would be compared for producing quality information and optimal decision making and problem solving strategies.

Unfortunately, currently, the scenario is for many countries not an ideal one. Thus it is important to acknowledge that sometimes there will be not enough data/information for the purpose of triangulation. And that although in such cases it may appear as the most logical solution to opt for the professional/expert source, this option may not qualify at all, as more than often, resources (financial and/or labour) will be scarce as the areas to be covered are too extensive (in terms of complexity or spatiality). Furthermore it is reasonable to conclude that crowdsourcing or citizen science data/information is better than no data at all. As *Meier* states: [...] *this information may not be verified but that doesn't mean it can't be useful*. (PM: 18'42")

Thus, even if valid is not the most suitable term due to its current bound to “validation processes” in the present context, crowdsourcing and citizen science⁴⁹⁸, should be considered as at least an acceptable data/information source, to be taken into consideration as other sources alike, being all subjected to the scrutiny of quality assurance frameworks⁴⁹⁹ *whenever applicable and possible*, where the level of accuracy and reliability will be assessed and compared with other data/information sources (triangulation) for enhancing cognition, that is, improving the overall quality of the data/information. When data/information coming from the crowd/volunteers is the only one available, the uncertainty of the data/information must be public reported and if any decision is to be based on this data, there must be an informed consent from stakeholders, who shall collectively agree to take the risk. In this case, accountability resulting from possible failure will be shared, among those stakeholders.

494 Section 5.2.2

495 See theoretical framework (section 3.6).

496 In alignment with the definition of data quality provided in the last section.

497 This may also be understood as multiple perspectives, when subjective information is concerned.

498 Also citizen journalism.

499 Based on the premises of uncertainty communication (see section 3.5), as the latter are the most suitable for such scenarios of huge data/information gaps and high stakes.

6.3.1 Emergency! The case of 911

“If data is to be useful and support good decision-making, it has to be ready at the time when decisions are being made or where the opportunity for influencing the outcomes is there. Trade-offs between timeliness and other quality dimensions depend on the purpose to which data is being put.”⁵⁰⁰

The statement above is from the IEAG’s report on data revolution and it makes explicit that depending on the urgency of the matter, other quality dimensions may be disregarded. On this matter, in spite of speaking of crowdsourced data/information as an extra layer, as a complement to other sources, *Verity* and *Meier* know this is not the only facet of the discourse. *Meier* has substantially contributed to the discussion on credibility and reliability of crowdsourced data/information through his blog, where he argues in favour of the consideration of crowdsourcing as a legitimate source, particularly in contexts of emergency. During the interview, *Meier* has attempted to deflect the criticism by comparing crowdsourcing to other data/information sources, pointing out similar flaws such as the lack of representativeness of the otherwise recognized as reliable sources, such as the UN. Moreover in his blog, he has brought to light a very insightful analogy analysis concerning emergency numbers such as 911⁵⁰¹ where he tackles fundamental topics such as verifiability, uncertainty, the emergency character and the cost benefit ratio (based on purposefulness and morality).

“Point being: despite these ‘data quality’ issues, European law enforcement agencies have not abandoned the use of emergency phone numbers to crowd-source the reporting of emergencies. They are managing the challenge since the benefit of these number still far outweigh the costs.”⁵⁰²

The example of emergency numbers, such as the 911, shows us that even in a reality where the dominant paradigm is fundamentally risk averse, there are exceptions defined by moral boundaries, which open space even for “anonymous projects” to be taken into consideration. That is, it is not morally acceptable (also not in accordance with human rights) to put people’s lives in danger by being over concerned with data quality for instance, that is, by being irrationally compliant with “the rules”⁵⁰³.

For this reason, emergency related fields such as disaster response or diseases outbreaks, are for instance, already many steps ahead than others with respect to crowdsourcing adoption. However the question: “*How urgent is urgent enough for moving from accountability to trust?*” remains. One good example regards environmental issues. Is climate change urgent enough? Or one could go even further and pose the same query to other fields related to human rights and sustainable development such as: how urgent is it that people have proper water treatment, food, electricity, internet access

⁵⁰⁰ IEAG (2014:16).

⁵⁰¹ Meier (2010; 2013).

⁵⁰² Ibid.

⁵⁰³ This situation happens more than often in the bureaucratic world and it is often criticized (also by the general public) as a form of hindering effectiveness rather than promoting it.

and freedom? These are provoking questions indeed, and express the same concern from another query posed previously: Do those people who would must benefit from the approaches in question deserve to wait indefinitely for the professionals to decide that it is a “safe move”?

6.4 Defining the Boundaries between Paradigms

Answering one of the queries posed in the last section; no, we should not wait indefinitely for wider acceptance of crowdsourcing and citizen science relying solely on improved data/quality systems and raised awareness concerning the procedures of data collection and its applications, as advocated by expert interviewees.

For accomplishing a data revolution as a means of achieving the SDG, it is crucial that these collaborative approaches for data collection and analysis start to be taken into consideration as soon as possible. For some matters, it could start now, especially when data coming from the crowd regards an emergency situation involving matters of life and death, or when it may be considered as a tool for pointing out where experts should look closer. For other matters, capacity building for data collection and analysis, also called data literacy, must be prepared and delivered. The same goes for capacity building concerning the use of technologies for data management (collecting, analysing and sharing).

The above considerations are pragmatic ones. Nevertheless, answering the second query⁵⁰⁴, pragmatism alone will probably not suffice. Crowdsourcing and citizen science by being one of the many ramifications⁵⁰⁵ of a greater paradigm shift concerning the restoring of mutual trust⁵⁰⁶ in society, already finds “blind resistance” grounded on prejudice, and deriving in turn from perceptions of reality tied to the current dominant paradigm.

The dominant paradigm, as it was elucidated throughout this work, is built on bureaucratic models, which have its foundations on hierarchical structures and on the notion of [modern] accountability⁵⁰⁷. [Modern] accountability may be seen as a form of control, which shall not be considered bad *per se* (as in transparency)⁵⁰⁸. Nevertheless, and unfortunately, this kind of accountability, has been consistently encouraging buck-passing and prompting risk-averse behaviours (through negative reinforcements combined with the instance of negativity bias)⁵⁰⁹. The problem here is that “to trust someone” is perceived in this context as a “risky move”, that is, individuals (again, reflecting organization’s behaviour as a whole) hold trust as a threat, the exact opposite of the original meaning of trust relating to notions of safety and support, and of confident expectations.

504 Regarding the suitability of the regular procedure characteristic of technology adoption cycles for resolving the phenomenon in question (of reluctance from the part of organizations in embracing crowdsourcing and citizen science).

505 Explained in chapter four (section 4.6).

506 See definition in theoretical framework (p.35).

507 Before top-down, today in other directions (bottom up and between organizations and institutions) as explained in detail in section 3.3, but still based on the same principle of [modern] accountability.

508 See section 3.3 for more details.

509 See section 3.2.2 for more details.

In this section we will look for the factors determining acceptable and non-acceptable practices within the current dominant paradigm pictured above in order to identify deadlocks preventing alternate paradigms to emerge and consolidate.

6.4.1 Professionals *vs.* Non-Professionals?

Prejudice is easily identified when we find a professional stating that she/he does not work with unverified data/information. However, if another professional has collected the data or reported the information, it becomes “automatically verified”. That is, no one questions the quality of data/information coming from a “professional source”. So what shapes this uneven scenario?

Some could argue that professionals have more capacity for collecting and analysing quality data and reporting on quality information, based on the fact that professionals have been through some kind of capacity building⁵¹⁰ process, ideally formal, otherwise they could not be called so. It is true that the know-how directly impacts quality outputs. Yet, professionals, as any human being are also subjected to make mistakes, be it due to any external distraction, lack of motivation, poor capacity building (which does also ensue certificates), etc. So what other factors may support the prejudice? For an alternate perspective, let us look back into the case of volunteers.

6.4.2 The Case of Volunteers in the UN and NGOs

Many NGOs and also the UN rely largely on volunteers for carrying a variety of tasks. Volunteers can be professionals or amateurs and as we have seen in chapter four⁵¹¹, the reasons why people volunteer (motivations) drastically vary. Hence it is possible to assert that “volunteers” are heterogeneous groups, as “the crowd” or “communities”.

So does the reliance on volunteers from the part for these organizations, makes the data/information produced and released by the latter unreliable? As we know, this is not the case. But what is the difference between volunteers working inside organizations and the crowd or volunteers from communities (e.g. in participatory environmental monitoring)? “Traditional volunteers” are welcome, that is, it seems to be, in opposition to crowdsourcing and citizen science, not much of resistance from the part of the organizations *vis-à-vis* this kind of work force.

One of the explanations lays on the motivational triggers leading people to the volunteer-sector (within organizations). As we have seen, a great portion of people volunteer for some reason related to “career advancement”⁵¹², others (particularly elders) have reported reputation in the community as something important⁵¹³. Thus both of these reasons make the volunteer not dependent on the organization as a source of income, but maybe as a source of “certified reputation”.

Such a dependency will invariably imply oversight, from the part of the organization over volunteers, subjecting the latter to the rules of the organization. More than often, volunteers working

510 It is no longer morally acceptable to refer to “training”.

511 Section 4.5.

512 Ibid.

513 Okun (1994); see section 4.5.2 for a more detailed explanation.

for NGOs and the UN do also have contracts. This means that these volunteers may be held accountable in the case of deviation of conduct (or misconduct) in accordance to stipulated rules. For illustrating this scenario, it is interesting to look at how volunteers are held accountable within organizations. The following passage was extracted from the UN Volunteers (UNV) website:

“The main functions are to provide an objective review of independently investigated allegations of misconduct involving UN Volunteers, and recommend to the EC appropriate disciplinary measures or exoneration of UN Volunteers from allegations of misconduct.”⁵¹⁴

Hence volunteers which are independent from the organization, working remotely are not *easily* subjected to systems of accountability in opposition to traditional volunteers (maybe not up to the same extend as professionals, but still). At this point we can see that the “amateur” or “non-professional” character is not the only factor making data/information coming from the crowd or other collaborative approaches “unreliable” in the eyes of the organization, but a much more decisive factor is whether or not the individual providing the data/information may be held accountable.

6.4.3 No One to Blame: anonymity and massive number of contributors

Being placed within hierarchical structures of oversight is one decisive factor, as explained above. Still there is another important factor of more relevance to crowdsourcing (also citizen [crowd] science) approaches which, in contrast to the scenario just described, does not just add an extra complication for holding contributors/volunteers accountable, it makes it impossible: the anonymity character. That is, if there is no face to blame, accountability mechanisms become impracticable.

Crowdsourcing implies anonymity. However, anonymity in the context of crowdsourcing, on the contrary of what most people may think, is not defined by the existence or lack of a profile (with real name hosted by the platform). In fact, as we know, also those not registered, may be somehow identified through their IP address. The anonymous character here is defined by the massive number of contributors, that is, even if the organization has access to the personal data of individual contributors, if they are thousands, it becomes unfeasible to hold them accountable, as it will be explained in the next paragraphs.

As we have seen in the case of “traditional volunteers”, the negative reinforcement following blame attribution does not regard loss of “income”, as in the case of professionals⁵¹⁵, but damage on or loss of credibility or reputation of the volunteer within the organization and extended community (linked to the organization). Withal in a scenario where the number of volunteers/contributors is massive, even if the organization blames an individual contributor publically through the platform (an effective method concerning face-to-face interaction), the individual will not suffer any punishment in real life. For that the lack of face-to-face interaction implies the inability of other contributors/volunteers to morally punish the blamed individual as ultimately, they do

514 See: [<http://www.unv.org/about-us/accountability.html>].

515 Note that professionals do also value reputation and credibility, sometimes over “income”. See chapter four (section 4.5) for more detailed explanation.

not know him/her. Thus in this case, the consequence of misconduct⁵¹⁶ of an individual contributor/volunteer will be the exoneration from the platform, but as we have seen, in real life there will be no punishment.

In the case of citizen science projects for instance, or participatory monitoring, volunteers of the community may be in some sense also anonymous for the organization which will make use of the data/information produced, placing the volunteer outside the organization's hierarchical structure (the case of traditional volunteers), making difficult but not impossible for the organization to directly hold him/her accountable. Nevertheless they are not anonymous for their own community, where peer-to-peer accountability (also based on credibility and reputation, or morality) takes place. And still, organizations may contact the leader of the community to pay closer attention to the volunteers, as inconsistencies in the data/information outputs become noticeable.

Hence anonymity, understood as “no face to blame”, is probably the main concern of professionals within organizations (in macro, organizations as whole) regarding the collaborative approaches in question, as it prevents (in the case of crowdsourcing) and hinders (in the case of citizen science and participatory monitoring) buck-passing or risk transfer.

It is interesting to note that by the point when technology will be in the *state of the art* for classifying and analysing crowdsourcing and citizen science data, the presented scenario will no longer be considered a problem as the “buck will be passed” to “the machine”, that is, “to the system”, as it works today with manuals and protocols⁵¹⁷. This is also one of the reasons⁵¹⁸, why novel approaches become accepted by the end of the technology adoption cycle, when standards, best practice manuals and quality assurance frameworks are created or adapted for the emergent technology or method.

To conclude, once more an accountability matter is placed in the centre of the discourse, as we have witnessed in the last paragraphs. In addition, accountability has multiple implications, depending on the level and direction that it is analysed, the most relevant were explained previously in this work⁵¹⁹. Notwithstanding, the very basic issue shaping prejudices is for all the same: blame avoidance (expressed as risk aversion) as a form of maintenance of a [safe] *status quo* (notions untimely related to self-preservation/survival instincts) by avoiding any threat. It is important to remember that today risk is quantified in economic terms, as neither an individual nor an organization cannot survive without financial supply.

6.4.4 Latent Paradigm Shifts: restoring trust in society

“And to overcome any crisis of trust, we must remember what trust is, and not try to replace it with control.”⁵²⁰

516 E.g. submitting biased or false entries to the system, among others.

517 See: p.27 (section 3.2.3) for a more detailed explanation.

518 Among others, such as: safety in numbers (sticking to the group) or validation through replicability over time.

519 See chapter three on accountability (section 3.3).

520 Baier (2013:183).

As it was discussed in detail in chapter four, practices and phenomena characteristic from latent paradigm shifts are in opposition to [modern] accountability systems within hierarchical structures, invariably based on mutual trust and on “natural accountability” as a resultant of trust⁵²¹. It is important to note once more⁵²² that by making oneself vulnerable, the one becomes also trustworthy; hence by trusting someone, the trustor makes him/herself vulnerable (by risk taking), being likely to be “trusted back”, characterizing mutuality as a closed loop.

“We must now embrace a culture of **shared responsibility**⁵²³, one based on agreed universal norms, global commitments, shared rules and evidence, collective action, and benchmarking for progress. The new paradigm of accountability that we seek is not one of conditionality or North to South, nor South to North, but rather one of all actors, governments, international institutions, private sector actors, and organizations of civil societies, and in all countries, to the people themselves. This is the real test of people-centred, planet-sensitive development.”⁵²⁴

In these scenarios, the common practice of “buck passing” or risk transfer, discussed in the last sections, is lessened as mutual relations of trust are based in collaboration and shared accountability. That is, decisions to be made under uncertain circumstances are discussed among stakeholders, and any decision will be made upon informed consent from all parts, which agree to share accountability in the case of possible negative outcomes.

Hence risk transfer as a practice, shall loose its strength as the latter will be shared. Within the new paradigm of mutual trust (a greater paradigm encompassing all others⁵²⁵ as its ramifications) people are ideally driven by intrinsic motivations⁵²⁶ and the use of blame and punishment as negative reinforcements would no longer be needed for motivating individuals. To trust someone will no longer be perceived as a threat (in opposition to the roots of the term, related to safety, comfort and support), as there is a common goal and all the involved parts benefit from honoured agreements; moreover the simple fact of initiating a relation of trust, of “taking the risk” (making oneself vulnerable) is universally perceived as a “positive move”, increasing the probability that there will be a positive feedback from the trustee(s). All these aspects combined will make individuals and organizations bolder and more creative, thus more capable to tackle our complex problems more efficiently and purposefully.

521 Conceptions and terms are explained in detail in the theoretical framework (section 3.3).

522 As it was already discussed in chapter three (p.35).

523 It is noteworthy that one of the multiple meanings of “accountability” is “responsability”.

524 Ki-Moon (2014:146).

525 The notions of post-normal science; of access and availability over ownership; of collaborative, participatory and peer-to-peer processes (e.g. modes of production and problem solving) fostering decentralization, and of the institutional format named “the commons” or “common goods”.

526 See section 4.5.1 on intrinsic motivation.

6.5 Trust and Accountability: an interplay

As Dubnik states, *accountability is considered to be the cause and the solution of all our problems*⁵²⁷. Although the last paragraphs have outlined negative aspects of accountability (the cause of the problems), for they are currently more striking than the positive ones, I have more than once throughout this work emphasized the importance of accountability mechanisms (also control mechanisms) in society, for the purpose of managing complexity and reducing uncertainty. The disproportion between negative and positive aspects of accountability, as outlined, may be interpreted as a manifestation of excess of accountability (or control) within organizations and in society in general. One (out of many) examples of the latter is clear on the following passage articulated by Glassman⁵²⁸ in interview to a podcast⁵²⁹, where “accountability” becomes “mutual”, a characteristic (previously) particular to trust relations, which have been left out from the equation:

“[...] that’s why I love the idea of a **mutual accountability** that all organizations should commit to some kind of coalescing around global standards for the presentation of data, for the cataloguing of data [...]”

This conjecture is strengthened as one looks at the current levels of trust in society (particularly public trust on institutions and organizations), which has been the lowest ever recorded⁵³⁰, and relates it to the point of view of various scholars⁵³¹ who argue that for a well-functioning social reality, there must be a “necessary balance between trust and control (accountability)”; that is, the excess of one, will undermine the other. Thus we may conclude that within the dominant paradigm there is an excess of accountability and consequently lack of trust.

6.5.1 A Decisive Paradox within Latent Paradigm Shifts

The excess of accountability as well as the low levels of trust within the dominant paradigm, may be, paradoxically⁵³², a symptom of the widespread attempt for restoring trust in society through a positive narrative of control (transparency). These attempts have been focusing on enhancing top-down accountability, that is, organizational transparency, based on the principle which links vulnerability to trust, where “transparency” would make organizations vulnerable, thus “trustworthy”.

However some critics claim that the end of secrecy (transparency) will not end deception.⁵³³ Nor it will restore trust in institutions and organizations. This may be understood in three ways: (1) if the “vulnerability” which should be a result from transparency, is held as being neither real nor helpful as it entails no real risk taking from the part of the organizations, who would not disclose compromising data (not to be generalized); (2) if in the current context, where accountability from

⁵²⁷ Dubnick (2011).

⁵²⁸ Amanda Glassman is the director of global health policy and a senior fellow at the Center for Global Development.

⁵²⁹ Barder, Malamed & Glassman (2014).

⁵³⁰ Heald (2006).

⁵³¹ As we have seen in chapter three, where the philosophy of trust and accountability was discussed, according to scholars.

⁵³² As the theory above (of necessary balance) is taken into consideration.

⁵³³ O’Neill (2002a: Lecture 4, pp.3-4).

the part of the organization does not mean much to the public, who does not know neither where to find nor how to interpret the disclosed information, the kind of trust expressed by the public towards organizations is considered as one of fatalistic acceptance (related to a situation of dependency) other than of genuine trust⁵³⁴; and (3) will be explained in the following paragraphs.

There are several issues with the excess of accountability in form of transparency, particularly concerning the impacts on an organization's inclination to risk, ultimately leading to poor problem solving and less effectiveness (the same behaviour pattern found between individuals within hierarchical structures). Some⁵³⁵ scholars refer to the phenomenon as the danger of over-exposure⁵³⁶.

As discussed in chapter three, it is interesting, for the purpose of optimal understanding, to look at the same notion (of transparency) applied the other way around, comparing the micro (individual) and the macro (organizational) levels. Bottom-up "transparency", outside of organizations, that is, demanded by authorities from the general public, is no longer called transparency, but surveillance⁵³⁷, or invasion of privacy, and it carries an extreme negative connotation, as we know. It has a negative connotation, as it is perceived to restrain individual freedoms, by excess of control. Notwithstanding individuals are willing to accept bottom-up accountability, with very definite boundaries, such as income tax statements, among others; as the latter are necessary for a desired order in society.

Transparency has been inadvertently demanded from organizations, but in the same way as there are boundaries for bottom-up accountability, as explained above, there shall also be boundaries for top down accountability. As the excess of the latter will impact organizational behaviour in a way that will make it less effective, as the main focus is shifted from solving real problems to blame avoidance. We cannot forget that organizations, are consisted ultimately by individual professionals, who cannot optimally solve problems (and be creative) if they have their autonomy undermined⁵³⁸. Moreover we know what happens when individual freedoms are constrained: people find "other ways". And so will organizations under over-scrutiny.

Relating the considerations above with the necessary balance between trust and accountability, if individual professionals and consequently organizations become risk averse due to over exposure, they will be less likely to trust someone (another employee, the people, or other organizations), as "to trust" is perceived as a risk. And it is, up to some extent, particularly under the current paradigm.

"For example, if everyone behaves as if others are generally untrustworthy, then people will actually be so. What matters most at the level of society as a whole is less whether people can make well-founded judgements about others, and more whether people are of such a character as to be inclined towards trust and

534 Waterton & Wynne (1999).

535 Behn (2001:11).

536 Heald (2006). These were discussed in detail in chapter three (section 3.3).

537 See: [<http://www.theguardian.com/world/surveillance>].

538 See: O'Neill (2002b).

co-operation. From this perspective, trust is less a matter of individual discernment and cognition and more like a kind of social glue that binds people into generalised relations of mutuality.”⁵³⁹

The degree to which these basic relationships impact trust in society as a whole is unmeasurable, still, as already mentioned, public mistrust has been rising under ever increasing demand for public accountability/transparency. Thus, one may infer that the quest for more accountability as a form of restoring trust in society has exactly the opposite effect: it is consistently undermining trust instead.

So how public trust could be restored, if not with more public accountability? With more trust. Not by excluding public accountability, but by increasing the level of trust to equal with that of control. But trust from the part of whom? If people are unwilling to trust governments and organizations at the moment? Trust should be generally promoted, particularly through the support of frameworks constructed by communities of practice of the latent paradigm shifts (presented in chapter four). As we know the latter imply among others, “trust in strangers” (e.g. crowdsourcing, citizen science and other peer to peer practices), which is a real challenge under the current dominant risk averse paradigm, which is always looking for a face to blame.

At this point, we come back to answer the query which was left open by the end of chapter five concerning how to argue with individuals blinded by the fear of punishment, characteristic of the dominant paradigm (of excess of accountability). How to overcome this prejudice, which in spite of being based on pragmatic assumptions, does actually derive from a deep-rooted ignorance concerning social structures and processes? On the contrary to that prejudice coming from little understanding with regards to the method *per se*, this kind of prejudice cannot be fought with “delivered awareness” or capacity building.

Instead I argue, based on the theoretical framework concerning the philosophy of language, Searle’s social ontology⁵⁴⁰, and particularly Fiorin’s conception of a “generative path for meaning”⁵⁴¹, that both the deadlock, preventing the latent paradigm shift based on mutual trust to emerge and consolidate as part of our social reality, and the key for resolving this paradox are found in the level of discourse. As explained in the theoretical framework, *the conceptions underlying latent paradigm shifts are supposed to be easily negotiated as they lie still within the generative path for meaning, most typically between the narrative and discursive levels and even, in a lesser extent, in the deep level*⁵⁴².

As an example of the power of the discourse, on a practical level, *Verity* discusses in interview, strategies for getting people to use crowdsourced data. He argues that they do not need to know right from the beginning that the main source of the data is the crowd, as organizations trust other organizations as means for providing “quality information”, and this *trust* generally suffices.

“[...] what happens is that if I give a product to a humanitarian responder and they have seen in past emergence, and they see that it is coming from OCHA,

539 Szerszynski (1999:246-247).

540 Chapter three (section 3.1).

541 Fiorin (1988); chapter three (section 3.1).

542 Chapter three (section 3.1, p.23).

or UNICEF or whoever, and they say: ‘oh I know who is writing this’; and they will look at it, they will consume it as they normally do and they probably won’t read the final imprint where it says that it comes from the humanitarian clusters and it is coming from crowdsourced data. Because they will trust that it has been through a verification process. If I put a big disclaimer on the top where it says that some of this data is from crowdsourcing, they will say ‘oh not, well I am not going to use it then’ [...]” (AV: 43’34”)

Instead he recommends that the crowdsourcing character of the data is disclosed after the product was already unreservedly consumed. The upcoming paragraphs will approach the role of public discourse and how to negotiate the latent paradigms within it.

But before moving forward, I would like to highlight the weight of trust in shaping people’s and organizations’ behaviours towards a given data set, as *Verity* has explained, the trust in another organization (or individual) is generally enough for accepting and using the information, not needing much of details on the primary data source. Thus, in this case, the organization or individual reporting the data/information, if credible (of good reputation), serves as form of validation, as perceived by others. In the same way, as mentioned in chapter five, the utility of community-based trust mechanisms for increasing crowdsourcing and citizen science data reliability has been discussed, implying an important link between trust relations and the production of truth, or “reliable data/information”.

The Role of Public Discourse

“His writing is not about something; it is that something itself.”⁵⁴³

“Yet we must not forget that the state is also people; people embedded in networks of social relations; people who are both produced by and who in turn produce discourse.”⁵⁴⁴

My stand is that the loud and generalized discourse demanding increased accountability from the part of organizations is preventing those latent paradigm shifts related to mutual trust to move from the immanent and manifest levels to the discursive level (level of expression)⁵⁴⁵, which is currently overwhelmed by “accountability” (also open data and transparency). That is, the excessive discourse on accountability is hindering the emergence and subsequent realization of paradigm shifts related to mutual trust.

This process acquires even more relevance if Barkin’s notion of the “discourse power of IOs”, particularly with regards to the UN (in the context of the SDG and data revolution) is taken into consideration:

543 Beckett (1984:27) on James Joyce.

544 Carolan & Bell (2003:240).

545 See: chapter three (section 3.1).

“A different sort of example is provided by the creation, under the auspices of the UN, of the concept of sustainable development. Once the concept became generally accepted within the UN, it began to find its way into the constitutional documents of other IOs as well. Gradually, it became the accepted concept within which international discussions of issues that affect both environment and development were discussed. The UN, by creating the idea of sustainable development as a standard, has thus created a language within which a whole range of issues is discussed.”⁵⁴⁶

Furthermore if we take a closer look at some of the conceptions discussed in chapter four, which are also part of latent paradigm shifts related to notions of collaboration, decentralization, mutual trust and the commons, such as those concerning the “open movement”, we will find the general paradox described above to be placed (possibly due to misinterpretations and/or misuse of the term) also within the core of latent paradigm shifts, creating an even more critical deadlock for their own consolidation, as it is the case of the discourse on a data revolution.

The open movement, although based on the notions described above, resting upon mutual trust, entails among others, the widespread notion of “open data” which has become the “hype motto” for demanding transparency from the part of the organizations. However, as we have seen, the open movement, stands primarily against centralized ownership, usually upheld by bureaucratic structures, based on hierarchical accountability. Hence it is questionable whether the word compound “open data” would be the most suitable one for demanding (quasi imposing) [modern] accountability, based on an unilateral relationship (in opposition to mutual relationships, such as trust), as it will be highlighted further in this section.

I argue that based on the mutuality underlying peer-to-peer rationales, open data does indeed concern the adage of more transparency from the part of organizations, as it relates to the advent of public participation in policy and decision making⁵⁴⁷; withal, open data would best fit that type of accountability resulting from trust (based in the natural law, morality⁵⁴⁸), expressed as truly volunteered disclosure of data/information, once the transparency derived from [modern] accountability (with roots on hierarchical bureaucratic structures) has many shortcomings, as advocated by scholars⁵⁴⁹, and does potentially undermine trust, that is, producing the opposite from the desired effect of restoring trust in society, as explained. Unfortunately the compound open data has been probably misinterpreted and/or misused by the “loud and generalized” discourse demanding more transparency and [modern] accountability, as mentioned. This scenario is not different within the discourse on a data revolution, which is, as we have discussed, essential for the realization of other paradigm shifts, especially those of concern to this thesis: crowdsourcing and citizen science.

It is out of the scope of this thesis to conduct a full discourse analysis for validating the hypothesis presented above. Nonetheless I have briefly analysed three official reports and one

546 Barkin (2006:24).

547 Fostering decentralization.

548 Explained in chapter three (section 3.3, p.32).

549 See chapter three (section 3.3, p.35).

statement⁵⁵⁰ concerning the post-2015 agenda and the data revolution and I have found that the discourse is indeed out of balance with respect to the mentions of the terms *trust* and *accountability*. The table to be found in Annex III concerns the outwardly analysed documents related to the respective number of mentions per term (account⁵⁵¹, accountability and trust), as well as the context in which the term *trust* appears.

In order to establish a benchmark, against which the reports may be compared, I have briefly examined two pieces of discourse, also in form of reports, emerging from the core of latent paradigm shifts, concerning “the collaborative economy” (prepared by the P2P Foundation) and “various other movements in alignment with the commons”⁵⁵² (prepared by main representatives of the Commons Strategies Group, New Economics Foundation and Co-operatives UK). The analysis has illustrated how the latter, in opposition to discourses still grounded on the dominant paradigms (to be discussed in the upcoming paragraphs), are deeply rooted on the main conception of the “latent paradigm”: trust. In the first report, on the collaborative economy, the number of occurrences for the base-word *account* was 41; for *accountability*, 1; and for *trust*, 42. It is noteworthy that a representative number of the references to the base-word *account* were related to “bank accounts”. In the second, 2 references of the base-word *account*, 0 of *accountability* and 10 of *trust*, were registered.

In the Synthesis Report of the Secretary-General⁵⁵³, the word *accountability* is mentioned 10 times and the base-word *account* (including accountability), 29 times; whereas *trust* occurs just once and within a negative context: [...] *trust deficit between governments, institutions and the people*⁵⁵⁴. In the latter, the term *between* may be well placed as the context does not imply one direction of trust, being possibly interpreted as a reference to a general lack of trust, also from the government and organizations towards the people.

Showing the same disparity, the report of the High-Level Panel of Eminent Persons on the Post-2015 Development Agenda⁵⁵⁵, registers 107 occurrences of the base-word *account* (being 18 directly related to the topic on data revolution), as well as 37 occurrences of the term *accountability* (10 directly related to the topic on data revolution). And finally, just 5 mentions of the term *trust* were traced (3 related to the discourse on data revolution through enhanced accountability).

The unevenness unveiled above between the recurrences with which the terms in question are registered is also present, within the discourse on data revolution, particularly within IEAG’s report⁵⁵⁶. Within the latter, for the base word *account* there were 20 mentions; for *accountability*, 11; and for *trust*, 7. Although in a first glance, quantitatively, it may look like the unevenness is smaller within the IEAG’s report in comparison with the other two reports concerning the post-2015 agenda⁵⁵⁷, by paying attention to the contexts in which the term *trust* is employed, it becomes clear

550 Eliasson (2014).

551 Note that the base word account has a high degree of sinonimity.

552 Bollier & Conaty (2014).

553 Ki-Moon (2014).

554 Ibid. p.15.

555 The Report of the High-Level Panel of Eminent Persons on the Post-2015 Development Agenda (2013).

556 IEAG (2014).

557 It is noteworthy, that the discourse on the post-2015 agenda does also encompass the discourse on a data revolution, as well as the role of technology for supporting the achievement of the SDG.

that its function in the discourse is: (1) to evoke more public accountability (transparency, open data), as *trust* acquires the meaning of “reward”, to be achieved through public accountability (open data and transparency), instead of being held as a primary in the relationship. The IEAG report is not the only making use of this line of discourse; the following quote is found on the statement of the deputy-secretary general on data revolution: *But public trust must be earned through evidence based on data.*⁵⁵⁸ And (2) also to promote trust, nevertheless regarding a *unilateral relationship (bottom-up)*, as often within this discourse, the trust urged is that on the data produced by organizations to be “reliable”, and on the organizations to not misuse people’s data.⁵⁵⁹

It was explained throughout this work how crowdsourcing and citizen science approaches are particularly suitable for providing more essential, timely (in case of data gaps and emergency) and also quality data (as it provides perspectives from otherwise “invisible” stakeholders and as it serves as a complement to other data sources). A data revolution is thus dependent on these non-traditional sources of data/information for its realization. Withal as our research question elucidates, there is reluctance from the part of the organizations to embrace these approaches as valid data/information sources, despite of bold individual professionals’ efforts (reflecting the behaviour of the organization they are inserted in) for changing the scenario.

We have, on the course of this work, came to the understanding that such reluctance is based on prejudice, derived in turn from little or lack of understanding on different levels. The most relevant one, has shown to be related to a deep-rooted ignorance of processes and structures framing our social reality. Hence, this main prejudice is directly related to the dominant paradigm, where, [modern] accountability as a norm of hierarchical bureaucratic structures, undermines mutual trust, by (among others) making individuals and organizations alike, disproportionally risk averse. The described phenomenon may be considered a classic scenario of paradigm clashes, as the latent paradigm shifts of concern to this thesis, including crowdsourcing and citizen science, and the data revolution itself, due to its dependency on the latter, are ultimately part of a greater paradigm shift supported by the notion of mutual trust.

This recapitulation ought to remind us on the need to take the risk of “trusting strangers” (no face to blame) in favour of crowdsourcing and citizen science, if a data revolution is to be consolidated; making thereby oneself vulnerable and thus worth of trust from its counterpart. If we consider the macro scenario, where organizations trust the people, such situation is accordingly conducive to the restoration of public trust.

558 Eliasson (2014).

559 The first mention refers to the trustworthiness of information (which in the same sentence is called to be diverse – p. 2). Second mention concerns the need to built trust among data users, again referring to the trustworthiness of data (p. 3). The third, regards once more building public trust in data, while in the same paragraph “high-quality “ data is evoked (p. 4). Fourth, refers to the danger of a breakdown in trust between people and the institutions. Here, as in other contexts (also from other reports), the word “between” is misused as it would imply a mutual relationship, although there is none, as the context informs, it concerns people who are to trust institutions to use their data. Still, in the same paragraph, the danger of “not verified data” is overemphasized (pp. 6-7), as it will be exemplified in the upcoming paragraphs. The fifth mention of the term trust, regards once more “public trust” in “governments” (p.8), and sixth mention is the only one which talks about building trust, without defining its direction (bottom-up), as the other mentions; it talks about the urge for standards (easing accountability/control) to build trust though (p.21). All the latter *in*: IEAG (2014).

With the previous paragraph in mind, let us go back to the two major issues identified within the discourse on data revolution: (1) trust held as a “reward” from accountability instead of a primer; and (2) the concept of trust rests upon a unilateral relationship. Taken these into consideration, I argue that neither of them are favourable for the realization of the scenario depicted above, for the former underestimates the role of trust for the consolidation of its own paradigm shift (data revolution), and the latter, regarding a unilateral (bottom-up) approach to trust, is neither likely to be effective in restoring public trust, as previously discussed, nor supportive of collaborative approaches for data/information collection (and analysis), which urges top-down trust, hindering consequently a data revolution.

As we have seen, by counting the occurrences of the terms within the discourse on a data revolution, it is easily identifiable that more weight is given to accountability than to trust. Moreover, the analysis above expresses part of the paradoxical discourse, emerging from the epicentre where old and new paradigms overlap. Within this overlap are the discourses (e.g. data revolution) in most urgent need to resolve such unbalances and paradoxes if they are to be consolidated. The following passages will add to the above analysis by providing an overview of how such paradoxes are expressed.

Although the IEAG’s report does not formulate it clearly⁵⁶⁰, other official statements openly acknowledge the need for embracing crowdsourcing and citizen science as a data source (**in bold**), while frequently, even in the same paragraph, formulating statements which interfere with the latter (underlined), unveiling the discursive paradox within the core of a latent paradigm shift:

“Second, we need to **explore new data sources, including those that come from citizens themselves**, to determine whether they can contribute to meeting the demand for data that is timely, detailed and disaggregated.”⁵⁶¹

“Fourth, the data revolution should include data liberation. We must facilitate open access to data. This will promote transparency and ensure accountability. It will also unleash the analytical creativity of users. **Grassroots communities should be able to participate in data collection, analysis** and decision-making.”⁵⁶²

“In all of this, we must maximize our commitment to public transparency, information sharing, **participatory monitoring** and open data [...]”⁵⁶³

“**A true data revolution would draw on existing and new sources of data** to fully integrate statistics into decision making, promote open access to, and use of, data and ensure increased support for statistical systems.”⁵⁶⁴

560 Maybe in order not to touch upon a sensitive topic for governments on a first stage? As we have seen in the interview’s analysis, some governments may “fear” data/information coming from “the crowd”.

561 Eliasson (2014).

562 Ibid.

563 Ki-Moon (2014:142).

564 The Report of the High-Level Panel of Eminent Persons on the Post-2015 Development Agenda (2013:24).

“We also call for a data revolution for sustainable development, with a new international initiative to improve the quality of statistics and information available to citizens. We should actively take advantage of new technology, **crowd sourcing**, and improved connectivity to empower people with information on the progress towards the targets.”⁵⁶⁵

Exposing the critical deadlock within the discourse on data revolution, the IEAG’s report, apart from making no clear mention on the need of adopting new or non-traditional data sources⁵⁶⁶, has also overemphasized the role of data quality through a negative statement which does also imply potential “threat” (directly opposing to genuine feelings of trust):

“People and the planet could also be harmed inadvertently, if data that have not been checked for quality are used for policy or decision-making and turn out to be wrong.”⁵⁶⁷

Moreover the IEAG makes exactly the opposite claim as *Meier* with regards to data quality and usability⁵⁶⁸:

“To be useful, data must be of high quality.” (IEAG’s report⁵⁶⁹)

“[...] this information may not be verified but that doesn’t mean it can’t be useful.” (*PM*: 18’42’’)

Based on the various considerations presented in this section, it was possible to pinpoint the main facets (being all interrelated and overlapping) of the paradox occurring within the discourse on data revolution (in the context of SDG), urging attention of those formulating the discourse within organizations entitled with this kind of power, “the one of discourse” (such as the UN, as explained in section 3.1).

Perspective 1 (based on the premise that excess of accountability undermines trust): urge for more top-down accountability (transparency) through open data policies for restoring public trust. In this, we ought to consider: accountability indirectly imposed (through public discourse) instead of volunteered; and accountability impacts on individual and organization’s behaviour towards risk (also undermined professional autonomy).

Perspective 2: is related to the last consideration, where claims for more accountability (bringing risk aversion about) are accompanied by emphasis of data quality; and concurrently, the need for new data sources (such as the crowd) is addressed.

Perspective 3: transparency fosters one way trust (bottom up), but nothing is stated about the other way, top-down trust, where governments and organizations ought to trust the people.

⁵⁶⁵ Ibid: executive summary.

⁵⁶⁶ In contrast to other reports, as clarified above.

⁵⁶⁷ IEAG (2014:6-7).

⁵⁶⁸ The hypotheses presented throughout this thesis are in agreement with *Meier’s* statement.

⁵⁶⁹ p.14.

Here this consideration overlaps with the above (2) as the new data sources in question need to be trusted (trust in strangers), for being considered in a first place.

Hence reframing the discourse on data revolution (within the agenda for Sustainable Development) is a necessary manoeuvre for unlocking the potential of the latter by promoting the kind of trust needed (on the people) from organizations (collective of individual professionals) to overcome their prejudice towards crowdsourcing and citizen science for data/information collection and analysis.

7 Conclusion: In the Crowd We Trust

This thesis has, relying on an extensive theoretical support, aimed at the ultimate answer for the one question: what is the reason behind the reluctance from the part of organizations to embrace [non-profit] crowdsourcing and citizen science⁵⁷⁰ as valid sources of data/information. The pursue of this answer has driven the research through non-predicted and previously unknown paths, unveiling multiple hidden influential factors as well as providing what I will call a “multi-layered answer”, as sub-research questions emerged throughout the way. Altogether has contributed to make this thesis a truly interdisciplinary piece of work.

The topic itself, crowdsourcing and citizen science, has shown to mean much more than catalysing innovation or democratizing science. From a practical perspective, the approaches, as means for filling data/information gaps, do not just contribute to, but show to be essential for the realization of a data revolution and consequently, for accomplishing the Sustainable Development Goals. Essential for there is no other way at the moment, be it due to scarcity of resources or of capable technologies⁵⁷¹. Hence when resources are scarce, crowdsourcing or citizen science data is better than no data at all, as nobody should remain invisible for policy and decision makers. Another good example of the use of crowdsourcing, citizen science, as primary sources of information was brought to attention by *Levine*, who during his interview, referred to crowdsourcing data/information (in the context of humanitarian aid) as a valuable source for knowing where to look at, to point out a direction. That means, considering the scarcity of professionals who shall personally acknowledge a humanitarian issue for instance, it may be crucial to have any source of data/information beforehand in order to have a good guess about where exactly such a professional is needed, where he/she should start looking at.

And essential, for these approaches are an important part of a broader context which focuses on the empowerment of the people through various ways (e.g. the rise of subjugated knowledges, participation in policy and decision making, local autonomy and decentralization). Such a context has been framed in the current network age, which has enabled multiple ideas to connect, forming a constellation of latent paradigm shifts within the technological and socio-political spheres, and which share one common value: mutual trust; notion which has shown to be the key for resolving the main research question as it relates to another relevant label given to the present context (a symptom of the dominant paradigm): the *age of public mistrust*⁵⁷².

Throughout the thesis, various challenges, as well as possible solutions, of the collaborative approaches in question, have been addressed in different levels and from different perspectives. Interviews have both contributed to bring about those widely perceived challenges, which were referred to as being based on pragmatic assumptions; and also to provide insights concerning hidden issues of meta-levels, which would through constant comparative analysis (between empirical data and literature), result on successive levels of abstraction and thereby of interpretation.

570 Also citizen journalism and community based participatory monitoring, as explained.

571 As it was explained regarding big data, limited number of professionals, among others.

572 Lövbrand, Pielke & Beck (2010:2).

By looking at crowdsourcing and citizen science through pragmatic lens, the issue of data/information quality and reliability will immediately stick out, as the literature on the topics does also reflect. Expert interviewees will in addition, call attention to the issue of “little understanding” in what concerns the methods *per se* (their processes and applications) as a cause of prejudice, which would in turn incite the reluctance from the part of organizations. Nevertheless prejudice deriving from little understanding, they agree, shall be a usual behaviour towards any novel approaches, as technology adoption lifecycles illustrate. In this case, the problem would be resolved with time and raised awareness.

Even though a variety of solutions (redundancy, reputation metrics, cross-media reference, etc.) were identified for tackling the issues of data/information quality in crowdsourcing and citizen science, the latter, turn out to be not particular to the approaches in question, but to all data/information collection and analysis under the current scenario of increased uncertainty, combined with high stakes (values). Such a scenario, urges another paradigm shift related to how data/information quality is assessed and communicated, called post-normal science. In post-normal science uncertainty is properly and openly communicated and policy and decision making involve all stakeholders, in alignment with other latent paradigm shifts, as discussed.

On the light of the above consideration, alternative data/information collection and analysis methods such as those relying on the general public, regardless of levels of reliability and accuracy should be considered, in an initial stage, as a valid (justifiable) information/data sources. For making this inclusion reasonable, uncertainty communication (also relying on augmented products⁵⁷³) should be included as a matter in official frameworks, in order to be more inclusive regarding the crowdsourcing and citizen science as well as to be more critic regarding traditional methods.

Through a phenomenological point of view (also informed by empirical data), the main challenge of crowdsourcing and citizen science has shown to be more closely related to the clash of paradigms (as these approaches are themselves part of latent paradigm shifts) rather than to pragmatic perceptions of the reality. Yet it is noteworthy that behind the pragmatism driving prejudice, emanating both from little understanding and on the grounds of data quality, lies the same essence informing the second line of research: social structures shaping our behaviour and social reality. The deep-rooted ignorance of such structures and processes shaping our social reality may too be considered a reason behind the prejudice towards the approaches in question, but as we have learned, in this case, the deadlock cannot be resolved by raised awareness through capacity building, but in another level, as I will discuss.

The notion of a “clash of paradigms” brings about the intriguing relation between accountability (control) and trust, been the former excessively evoked within the current, dominant paradigm, undermining the latter, as we have learned from scholars who argue that for a well-functioning society, trust must be equally proportional to accountability (control). That is, there ought to be balance between them; too less of accountability has too the potential to compromise the system, as the latter is fundamental for managing complexity on the grounds that oversight improves performance⁵⁷⁴.

573 Referring to blended materials, that is, information containing multiple data sets from multiple sources.

574 As discussed in chapter 6 (p.97).

Excess of accountability (inadvertently undermining trust) may be interpreted as a symptom of an increasing demand for the latter as a misguided strategy for restoring public trust, characterizing a paradox. This misguided strategy has been overlooking how too much focus on accountability will compromise organizational responsiveness, as it will ultimately impact individual professional's behaviour towards risk.

Based on innate instincts, such as survival and self-preservation, human beings are sensitive to risk. Under excessive oversight and unintelligent feedback and assessment mechanisms⁵⁷⁵, professionals tend to become more and more risk averse, losing eventually their autonomy in *pro* of box checking and meek reports. If professionals have their performance restrained, it is likely that outcomes will also show to be restrained, even poor, what will in turn influence the quality of the service delivered by the organization. As Behn explains:

“If accountability is pursued too harshly, public managers may thus learn the wrong thing, they learn to avoid risk taking, to pass the buck and to shield themselves against potential mistakes and criticism.”⁵⁷⁶

Risk transfer is a common practice, if not one of the main foundations of bureaucratic structures, and as explained above, if taken to extremes due to increased risk aversion, it does not just compromises responsiveness and purposefulness but also trust, as the latter is considered to be risky *per se*, although it is a form of risk management.

The considerations elucidated in the previous paragraphs are, from a phenomenological point of view, considered to be the main challenge of crowdsourcing and citizen science, for the anonymous⁵⁷⁷ character of these collaborative approaches invariably obstructs the process of risk transferring, as “a face” is needed if someone is to be held accountable (or blamed). Hence for adoption, these approaches need trust, particularly from the part of the organizations towards the public (potential volunteers); and more accountability, I argue, will keep holding it back, together with the data revolution, which needs the public for filling data/information gaps.

Moreover, the role of discourse in constructing social reality was discussed in the theoretical framework and reiterated in the previous section. These considerations are fundamental once it is possible, as we could see through the sample of what could become a discourse analysis (highly recommended for properly tackling the problem), to identify towards which paradigm (conceptions and values) the public discourse gravitates, and thereby make possible to reframe the discourse in order to balance or overturn the situation, depending on the interest of stakeholders.

As we have seen the discourse on data revolution, which should be promoting top-down trust and pondering its claims for accountability, is extremely out of balance. That is, the deadlock for the consolidation of the data revolution with the support of collaborative approaches for data/information collection and analysis, is placed inadvertently, within its own discourse.

575 In opposition to what O'Neill (2002a; 2013) has called “intelligent accountability” (qualitative assessment through report on failures and successes).

576 Behn (2001:16).

577 As explained in chapter six (section 6.4.3).

The analogy with the saying “in God we trust”⁵⁷⁸ has been drawn in order to call attention to the possibility of trust without the presence of a face (to blame) as a requisite for the latter. Furthermore the trust from people on their governments is too an example of trust expressed towards an anonymous group (due to the massive number of people it entails), even if this trust is a fatalistic one as discussed, or used as a form to assign responsibility to government, as the ability of people to hold wrongdoers (in government) accountable is limited. For if the people are to do it, they have to mobilize masses and target the leader which will hardly be the one who should in fact be held accountable. Thus the anonymity character here, as of concern to crowdsourcing and citizen science alike, does not invariably regard the lack of a face, but it expresses the inability of the people to hold the right individuals account.

Furthermore, with respect to the excessive demand for accountability from the part of organizations, if we do not trust organizations and try to hold them accountable, we do not risk and do not make ourselves vulnerable, thus “they” will also not be likely trust “us”. They will then “trust” professionals and people who can be held accountable, not because they trust, but because they can transfer risk, have a scape goat. Trust is undermined from all sides in this scenario. But if we are to trust them, they need to trust us as well, realization that challenges the current promotion of a unidirectional (bottom-up) trust in the political discourse, once it is and has always been mutual, if to be balanced and beneficial for all stakeholders.

The point I am advocating hereby is that the crowd (the people) ought to be trusted by the authorities and organizations, if the latter is to regain the genuine trust of the people. The crowd is trusted for choosing state leaders (though democratic processes, if properly applied). Why would they not be trusted for collecting and analysing data for the common good (ultimately their own good)? In support of this argument, the “crowdsurcing character” of democracy itself was discussed in chapter four and interviewee *Iacucci* has touched an intriguing subject which places the promotion of crowdsourcing as a discreditable approach in check, as the same rationale when applied to democratic processes, puts the legitimacy of governments in question⁵⁷⁹.

Once more I stress that the increase of trust in society does not need to be established on the cost of control mechanisms, but as I have argued throughout this thesis, both must be in balance for a well-functioning social reality. Furthermore it is paramount to note that power discrepancies may affect the way trust and accountability relations are exerted, and this matter was not considered in this thesis. However, besides of the fact that the latent paradigm shifts of concern to this study do also, by challenging dominant paradigms, defy power structures; if we take into account that power relations are too constructed through discourse, the approach here presented does too indirectly address the issue of power.

578 Motto of the United States of America since 1956.

579 “So I would say that for the government it’s tricky, and it goes a lot into their type of work, right? Like a government is supposedly responsible towards their citizen for what they do, and are supposedly already relying on a system that is a crowdsource system, right? Like the voting system the representation in the parliament, in a way, is a crowdsource system, right? So the ceration of crowdsourcing mechanisms for the government, it touches very in depth into how the government function and the legitimacy of that government and its specific relationship with the citizen. So I think the goverment has much more at stake in embracing crowdsourcing as a pure crowdsourcing project.” (AI: 20’ 024”)

“We are on the threshold of the most important year of development since the founding of the United Nations itself. We must give meaning to this Organization’s promise ‘**to reaffirm faith in the dignity and worth of the human person**’ and to take the world forward to a sustainable future.”⁵⁸⁰

The above quote is the Secretary-General’s closing remark of his synthesis report on the post-2015 agenda. I have chosen this statement both as an epigraph and to conclude this Master Thesis, as it reminds us of the need to have faith in the dignity and worth of the human person. Based on this premise and on the understanding of trust as the willingness to be vulnerable to the trustee, to rely on their competence and good will⁵⁸¹, I claim that every human being is worth of trust (until proved otherwise), as the latter is needed to build trustworthiness in a first place, as Baier notes:

“O’Neill sees trust as a response to perceived trustworthiness, as indeed it is, but it is equally true that trustworthiness is, to some degree, a response to trust. A person who is never trusted cannot show that she is worthy of trust.”⁵⁸²

Besides, recalling the conceptions underlying the epigraph of this thesis, which refer to O’Neill’s stand that it is our duty to be trustworthy, not our right to be able to trust safely, and based on the remarks of *Witt* and other interviewees, who have stated that creative, forward-thinking and bold individuals are those making all the difference, whatever the size of the organization and the extent of the bureaucratic structure, we may, apart from reframing the discourse, as its unbalance, was held as the behind the phenomenon in question, and following Tolstoy’s advice back in the 19th century⁵⁸³, want to look inside and change ourselves, since ultimately, we are the ones producing and being affected by discourses.

580 Ki-Moon (2014:161).

581 Baier (2013:175).

582 Ibid. p.183.

583 Tolstoy (1900:29).

8 List of Abbreviations

CAPS: Collective Awareness Platforms for Sustainability and Social Innovation

CCC: Citizen Cyberscience Centre

DIY: Do It Yourself

ESS QAF: Quality Assurance Framework of the European Statistical System

HRW: Human Rights Watchers

IEAG: Independent Expert Advisory Group

INGOs: International Non-Governmental Organizations

IO: International Organizations

NGOs: Non-Governmental Organizations

NQAF: National Quality Assurance Frameworks

SDG: Sustainable Development Goals

SHD: Sustainable Human Development

UN: United Nations

UNDP: United Nations Development Program

UNEP: United Nations Environmental Program

UNICEF: United Nations Children's Fund

UNITAR: United Nations Institute for Training and Research

UN-OCHA: United Nations Office for the Coordination of Humanitarian Affairs

US: United States

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10 Annexes

Annex I: Research Questions

Main (driving) Research Question:

“What is reason behind the phenomenon where most organizations and institutions have been reluctant in adopting (non-profit) crowdsourcing and citizen science as data/information sources?”

Interview Questions (pragmatically formulated for addressing the main research question):

“Which of the three actor groups of concern to this research (NGOs, UN and governments) is more likely to act positively toward crowdsourcing and citizen science approaches and why?”

“Which are the most frequently named issues of these approaches that may be hampering wider acceptance and adoption, and what are the proposed respective potential solutions?”

Auxiliary Research Question (ensuing from interviews' outcomes):

“What lays behind the prejudice towards crowdsourcing and citizen science?”

Annex II: List of Interviewees and Interview's Metadata

FP (Francesco Pisano)

Director for research, technology applications and knowledge systems at the United Nations Institute for Training and Research (UNITAR)

Via Skype

5. February 2014

Number of audio [.mp3] files: 3

FP1: starting at 2:32pm; 33'08" (length)

FP2: starting at 3:11pm; 10'55" (length)

FP3: starting at 3:26pm; 02'39" (length)

Total length of the interview 46'42"

PM (Patrick Meier)

*Internationally recognized thought leader on humanitarian technology and innovation. Author (2015): "Digital Humanitarians: How Big Data is Changing Humanitarian Response." Previously: Harvard Humanitarian Initiative, United Nations, World Bank. Currently: QCRI. PhD from Fletcher School, Pre-Doctoral Fellow at Stanford and MA at Columbia.*⁵⁸⁴

Via Skype

Number of audio [.mp3] files: 1

05. February 2014 (starting at 4:37pm)

Length of the interview: 38'50"

RW (Ron Witt)

Regional coordinator for Europe from the United Nations Environmental Program's (UNEP) division of early warning and assessment (DEWA)

Via Skype

7. February 2014

Number of audio [.mp3] files: 2

RW1: starting at 3:06pm; 26'09" (length)

RW2: starting at 3:32pm; 12'37" (length)

Total length of the interview 38'46"

AI (Anahi Iacucci)

Senior Innovation Advisor, Internews Center for Innovation & Learning

Via Skype

Number of audio [.mp3] files: 1

7. February 2014 (starting at 5:35pm)

Length of the interview 39'07"

⁵⁸⁴ From his blog "iRevolution": [<http://irevolution.net/bio>].

SH (Sanjana Hattotuwa)

Senior Researcher at the Centre for Policy Alternatives; founding editor and curates the entire media operations of Groundviews⁵⁸⁵, Special Advisor to the ICT4Peace Foundation; TED Fellowship; News & Knowledge Entrepreneur Fellowship from the Ashoka Foundation.

Via Skype

Number of audio [.mp3] files: 1

11. February 2014 (starting at 11:26am)

Length of the interview: 01:13'41"

SA (Salem Avan)

Chief Officer for information systems at UN Peacekeeping. Salem is chief knowledge management office of the United Nations, whose task is to make sure that the organization manages its knowledge effectively.

Via Skype and telephone

18. February 2014

Number of [.mp3] files: 3

SA1: starting at 5:10pm; 12'42" (length)

SA2: starting at 5:25pm; 00'36" (length)

SA3: starting at 5:26pm; 08'36" (length)

Total length of the [recorded*] interview 21'54"

*This interview has been not fully recorded due to "bad connection".

AV (Andrej Verity)

Disaster responder and information management officer for the United Nations Office for the Coordination of Humanitarian Affairs (UN-OCHA)

Via Skype

Number of audio [.mp3] files: 1

25. February 2014 (starting at 3:06pm)

Length of the interview 1:05'38"

DH (Dirk Helbing)

Chair of sociology, in particular of modeling and simulation in the Swiss Federal Institute of Technology Zürich; and also the head of the ambitious project FuturICT⁵⁸⁶.

Via Skype

Number of video [.mp4] files: 1

26. February 2014 (starting at 5:44pm)

Length of the interview: 55'13"

⁵⁸⁵ [<http://www.groundviews.org>].

⁵⁸⁶ [<http://www.futurict.eu>].

GO (Gisli Olafsson)

Emergency response director in Nethope.

Via Skype

Number of audio [.mp3] files: 1

28. March 2014 (starting at 9:39am)

Length of the interview: 23'23"

IL (Iain Levine)

Program director from the Human Rights Watch (HRW)

Via Skype on the 30. July 2014

*This interview could not be recorded due to technical problems.

Annex III: Counting Terms in Reports

	account (and variations)	from the latter, accountability	trust (and variations)	context of the former (trust) or comments on the last two (benchmarks)
IEAG' report on data revolution for SD ⁵⁸⁷	20	11	7	“More diverse, integrated, timely and trustworthy information can lead to better decision-making and real-time citizen feedback.” (p.2) “The disparate worlds of public, private and civil society data and statistics providers need to be urgently brought together to build trust and confidence among data users. We propose that the UN establish a process whereby key stakeholders create a “Global Consensus on Data”, to adopt principles concerning legal, technical, privacy, geo-spatial and statistical standards which, among other things, will facilitate openness and information exchange and promote and protect human rights.” (p.3) “It means seeking out high-quality data that can be used to compare outcomes and changes over time and between and within countries, and continuing to do so, year after year. It means careful planning, spending money on technical expertise, robust systems, and ever-changing technologies. It means making data available, building public trust in the data, and expanding people’s ability to use it, so that their needs are at the heart of these processes.” (p.4) “There is a longer-term cost if a breakdown in trust between people and the institutions that have access to their data means that people do not feel confident giving consent to uses of their data for the social good, such as to track patterns of disease or assess inequalities. People and the planet could also be harmed inadvertently, if data that have not been checked for quality are used for policy or decision-making and turn out to be wrong.” (pp.6-7) “If the new world of data is to be based on public trust and public consent, there has to be a confidence that governments can and will play this role, at least in part through the creation and enforcement of new rules. It is

587 IEAG (2014).

				governments – ideally working in collaboration with forward looking and socially responsible private institutions, civil society and academia – that can set and enforce legal frameworks to guarantee data privacy and security of data for individuals, and ensure its quality and independence.” (p.8) “And key donors announced recently the establishment of a trust fund to support developing countries’ plans to establish [...]” (p.19) “We recommend that the UN develop a comprehensive strategy and a roadmap towards a new ‘Global Consensus on Data’, building upon existing efforts in other domains, setting principles and agreeing standards to build trust and enable cooperation, including: • Agree on and promote adoption of specific principles related to the data revolution [...] • Accelerate the development and adoption of legal, technical, geospatial and statistical standards [...]” (p.21)
The Report of the High-Level Panel of Eminent Persons on the Post-2015 Development Agenda ⁵⁸⁸	107	37	5	“[...]cycle of conflict and distrust” (p.4) “Many companies recognise, however, that if they are to be trusted partners of governments and CSOs, they need to strengthen their own governance mechanisms and adopt “integrated reporting”, on their social and environmental impact as well as financial performance.” (p.11) “Accountability is central to the global partnership and, in line with that spirit, all parties should respect these lines of accountability and trust their partners to fulfil their commitments.” (p.23) “[...] international trust and belief in the credibility of the UN would be at stake if the MDG targets were to expire without agreement on what will succeed them.” (p.24) “A transparent and inclusive process will help build the conditions for political agreement, but it alone is insufficient. The courage and personal commitment of political leaders will be needed to reconcile myriad national views, and to embrace useful insights from others. We must develop trust through dialogue, and learn lessons on reaching consensus from other multilateral processes.” (p.25)
Synthesis Report of the Secretary-	29	10	1	“The public discourse has underscored the call for the urgent need to recognize and address the trust deficit between governments, institutions and the people.” (p.15)

⁵⁸⁸ The Report of the High-Level Panel of Eminent Persons on the Post-2015 Development Agenda (2013).

General On the Post-2015 Agenda ⁵⁸⁹				
Syntetic Overview of The Collaborative Economy – Report prepared by the P2P Foundation ⁵⁹⁰	41	1	42	Here, it is noteworthy that a representative number of the references to the base word <i>account</i> were related to “bank accounts”.
A New Alignment of Movents? A Report on a Commons Strategies Group Workshop ⁵⁹¹	2	0	10	The two appearances of the word base <i>account</i>, have been used in the following contexts: “This micro-business sector accounts for 57% of jobs in Greece.” (p.4) “[...] the multistakeholder credit union movement has expanded since the mid- 1990s and multistakeholder solidarity co-ops today account for 60% of the new co-operatives being set up.” (p.7) That is, referring to the meaning of “supply or make up (a specified amount or proportion)”⁵⁹².

589 Ki-Moon (2014).

590 Bauwens, Mendoza & Iacomella (2012).

591 Bollier & Conaty (2014).

592 Oxford Dictionary: [<http://www.oxforddictionaries.com/definition/english/account-for?q=account+for>].

PERSONAL INFORMATION

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 Skype raquelrvt

Sex Female | Date of birth 4 Jan 1987 | Nationality Brazilian

WORK EXPERIENCE

12/05/2013–12/11/2013

Intern

United Nations Institute for Training and Research - UNITAR, Geneva (Switzerland)

Contributing for [Click4it](#) (UNITAR Learning and Training Wiki) by conducting research on innovative trends in the field of learning & training and writing articles.

The main research topics were among others:

- The open world (open knowledge, open learning environments, open educational resources, open science, open education, open culture, open source, open access, open processes, etc.).
- Citizen Cyberscience, distributed learning, distributed cognition, networked learning, connectivism, crowdsourcing, crowdfunding, big data, web literacy.
- Gamification, gamification of education, game-based learning, game thinking, game design, badges, intrinsic and extrinsic motivation, problem-based learning, learner/player generated context/content.
- MOOCs, video-based learning, flipped classroom, open courseware.
- Flexible learning, linear learning, learning behaviour.
- Sharing economy, collaborative economy, gift economy, gig economy, new currencies.

In parallel with the research activities for Click4it, I have further contributed with KSI (Knowledge Systems Innovation Unit of UNITAR) through knowledge curation, - management, - translation and visualization. Follow the link to see some [results of these work](#) and a [visualization of "Open Knowledge" published by the P2P Foundation](#).

01/10/2010–01/02/2011

Portuguese Teacher

TUDIAS - Technische Universität Dresden Institute for Advanced Studies, Dresden (Germany)

01/09/2008–01/09/2009

English Teacher - Volunteer

Arco-Íris - Grupo de Assistência à Criança Carente - NGO, São Paulo (Brazil)

01/04/2009–15/12/2009

English Teacher

Instituto de Educação Beatíssima Virgem Maria, São Paulo (Brazil)

I had the opportunity to teach regular English classes for eight months, every day of the week (in the morning), summing up more 800 hours of teaching experience with all ages, from early childhood (age 4-7) to the high school (age 15-17).

This experience has provided me with practical knowledge on classroom dynamics in all ages, educational practices in a traditional system, alternative educational approaches (since I was given some freedom to experiment new methods) and on the very special relationship master-pupil. The time also coincided with the year I have spent in the Faculty of Education, while obtaining my license degree for teaching.

01/09/2007–30/04/2008

Intern

IEB - Institute for Brazilian Studies in the University of Sao Paulo, São Paulo (Brazil)

Internship by the Digitalization Project for Library and Research

Digitalization methods and processes; Technical features; Desktop Publishing tools (InDesign), Photoshop (photo editing).

EDUCATION AND TRAINING

01/10/2011–present

Master of Arts in Global Studies

University of Leipzig and University of Vienna (joint degree), (Germany/Austria)

The EMGS (European Master in Global Studies) Program (click on the link for more detailed information) is a transnational program; a consortium formed by five European universities (London School of Economics, Vienna, Leipzig, Wrocław - Poland, Roskilde - Denmark) and others overseas.

"Students choosing the programme study at two different European universities, at each for one academic year. After having successfully completed the programme they are able to analyze processes of globalization in various academic ways and are thus well-prepared for both, academic positions dealing with global phenomena and jobs in supranational agencies and non-governmental organizations, as they are ready to work as intercultural mediators and in the fields of development cooperation, economy, management and beyond."

I was for the first year in Leipzig (out 11 - set 12) and the second year in Vienna (out 12 - apr 13), I am currently finishing my MA thesis on the topic: "Accountability and the blame game in crowdsourcing".

What is Global Studies?

01/01/2009–31/12/2009

Licentiate degree, Portuguese Language, Literatures and Linguistics; Various Cultural Studies

University of São Paulo, (Brazil)

Educational Theories, Psychology of Education, Teaching methods.

01/02/2005–31/12/2008

B.A. in Portuguese Language, Literatures and Linguistics; Various Cultural Studies

University of São Paulo, (Brazil)

PERSONAL SKILLS

Mother tongue(s)

Portuguese

Other language(s)

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken interaction	Spoken production	
English	C2	C2	C2	C2	C2
German	C2	C1	C2	C2	C1
Spanish	B2	C1	B2	B1	A2
French	A1	A2	A1	A2	A1

Levels: A1 and A2: Basic user - B1 and B2: Independent user - C1 and C2: Proficient user
Common European Framework of Reference for Languages

Communication skills

Effective communication, persuasive public speaking; cultural awareness (through years of living abroad and studying in a culturally diverse environment); Flexible thinking;

I deal well with critics, listening to it carefully and acting positively towards improvement.

I am an open-minded, interested, observant, outgoing person who is able to work well both in a team and independently.

Organisational / managerial skills	I am in general a much organised person; My academic experience has included honing my writing and research skills.
Job-related skills	Research, writing, teaching, advanced media presentations, theoretical knowledge, analytical and abstraction capability, critical and complex thinking, flexible and creative/innovative thinking;
Computer skills	Technically proficient in Microsoft Office Suite, Photoshop, InDesign, Corel Draw, Adobe Acrobat, Premiere Elements and in most of Mind Map softwares.
Other skills	▪ research, writing, teaching; ▪ advanced media presentations, click on the following links to see some examples: <u>Comparative Analysis</u>, <u>The Nature of the Beast</u>; ▪ knowledge management, -curation,-translation, -visualization; ▪ theoretical knowledge; ▪ holistic view, interdisciplinarity; ▪ analytical and abstraction capability; ▪ critical and complex thinking; ▪ problem solving skills; ▪ flexible and creative/innovative thinking: I am very creative and always looking for innovative ways of approaching the task I am working on, as well as contributing to the team, project or institution with new ideas based in the last trends on research and practical fields of the subject matter. ▪ graphic design: I am also an amateur graphic designer, feel free to visit <u>my gallery</u>. These skills are highly relevant for the design of high standard presentations, knowledge visualization and translation.

ADDITIONAL INFORMATION

Courses	United Nations Institute for Training & Research - UNITAR ▪ Facilitation Skills ▪ Innovative Collaboration for Development - Social Media and WEB 2.0 for Development SENAC - Sao Paulo ▪ Photoshop, InDesign, Corel Draw
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Fields of Interest	Main current interests: ▪ Integrated technologies for community-based forest monitoring and management; including: remote sensing (satellites, drones) and multi-spectral imagery; crowdsourcing (mainly through geo-tagging and sensors); ▪ Collaborative thinking and problem solving; citizen science and citizen journalism; ▪ ICTs for Education, Development and Sustainability; ▪ Principles of green economy; Carbon Market; Payment for Ecosystems Services; ▪ Global systems and systems thinking; ▪ Collaborative economy, makers movement, open movement, peer-to-peer processes and modes of production (based on the commons, decentralization and empowerment of grassroots communities); de-growth movement, transitional towns and their respective roles in UNEP's green economy;
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- The Commons as an economic model;
- Big Data.

Other interests:

- Open Knowledge, -Education, -Science and -Research, -Data, -Source; OER (Open Educational Resources); Open Courseware; Open Learning Environments;
- Educational Theories and EdTech; Distributed Learning; Game-based-learning/Serious games; OLE(Open Learning Environments); 'The networked student';
- Cosmopolitan Education;
- Digital Cosmopolitanism;
- Interdisciplinary/Cutting-edge Research: Computational Social Sciences: the construction and mapping of the social brain from Big Data and its visual representation (Knowledge Architecture); Postmodern Geographies-Space in Critical Social Theory; The Macro as a reflection of the Micro - a parallel between the structure and behaviour of society and its main ruling systems(e.g. capitalism) and the cognitive sciences; Systems Theory; Complexity Theories; Networks;
- Global Cities (segregation, diaspora, cosmopolitanism, etc.);
- Cultural Studies.